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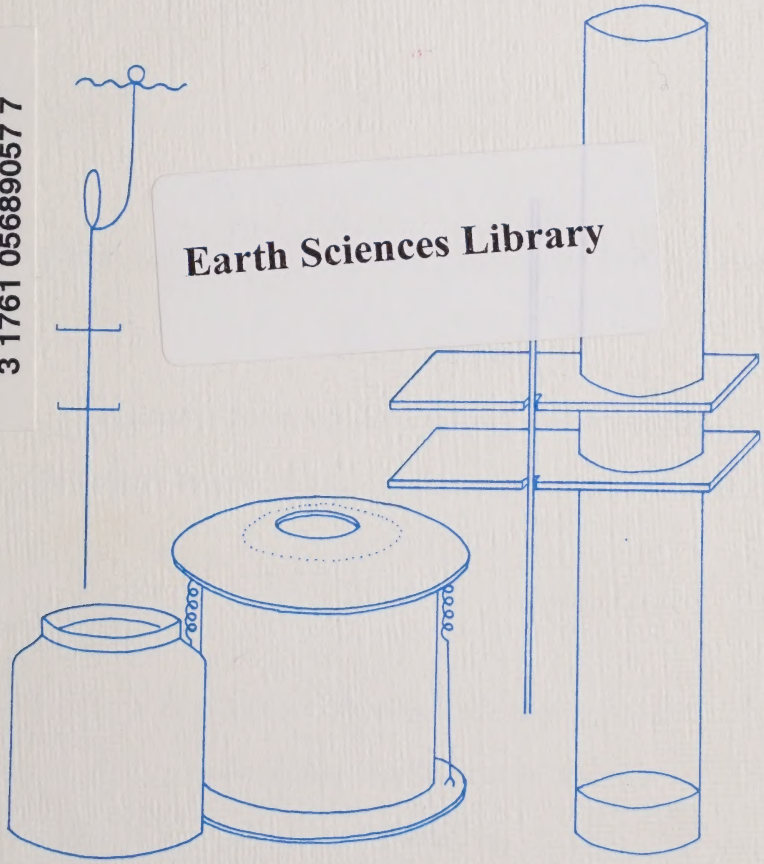
AQUATIC SEDIMENT TRAPS AND TRAPPING METHODS

C. S. Reynolds, S. W. Wiseman & W. D. Gardner



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IN MEMORY OF
DR. JUDITH F. M. HOENIGER
1987

Judith Hoeniger

An annotated bibliography of

AQUATIC SEDIMENT TRAPS

and

TRAPPING METHODS

compiled by

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Freshwater Biological Association

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IN MEMORY OF
DR. JUDITH E.M. HOENIGER
1927

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INTRODUCTION

Devices for intercepting particulate matter sinking passively through water (sediment traps) have been used for over eighty years. During the last three decades, however, increasingly greater use of traps has been made in biological, geochemical and geological investigations of aquatic systems, as well as for special studies of particular problems. There is little doubt that this trend will continue, and that the literature (over 250 published descriptions of traps and their deployment are currently available) will steadily expand. Recently, the fastest expansion in the use of sediment traps has occurred in the open sea, where technological advances have made their use possible.

Unfortunately, there has been no standard design of sediment trap, nor has there been any general approach to their use. Moreover, insufficient attention has been focussed on the performance characteristics of the various designs of trap arbitrarily selected by different workers. It is therefore difficult either to assess the reliability of the data obtained hitherto, or to compare results from different environments. This annotated bibliography is intended (i) to give as reasonably complete an overview of the existing literature as possible, and (ii) to offer some practical guidance in the selection and operation of sediment traps in future monitoring programmes. A more detailed review of sediment-trap techniques, prepared by Bloesch & Burns (1980), should also be consulted.

TRAP DESIGN

Common to all trapping procedures is the need to intercept negatively buoyant particles sinking through a medium which, to a greater or lesser extent, is characterized by turbulent or convective motion. Under genuinely quiescent conditions, when the particle trajectories may approach vertical, almost all designs of collector are likely to function efficiently; particles settle through the mouth of the trap at approximately the same velocity as they would descend through a column of water of the same cross-sectional area (Gardner 1977, 1980a; Hargrave & Burns 1979; Bloesch & Burns 1980). Provided laminar flow is maintained

around the particle, satisfying the limiting condition Re < 0.1, where Re is the Reynolds number of that particle, its mean downward velocity relative to the entraining water will be unaffected by turbulence. However, its trajectory will be constantly modified by virtue of its partial entrainment in the flow, whose horizontal velocity may exceed the settling velocity by several orders of magnitude. In order to gauge accurately the net vertical component of particle motion it is desirable that the trap should not alter the external entrainment yet effectively remove the horizontal component inside the trap, to allow retention at the base. It has been shown on theoretical grounds (Hargrave & Burns 1979; Bloesch & Burns 1980) that the most efficient trap in this respect is a simple, open cylinder. Laboratory calibrations of cylindrical traps against known settling fluxes in horizontal currents of 40-50 cm s^{-1} have shown that trapping efficiency increases with increasing aspect ratio (the ratio of height : internal diameter) up to 5:1 and is thereafter asymptotic (Hargrave & Burns 1979). Field calibrations, where absolute settling fluxes and current velocities were unknown, indicate that trap efficiency reaches asymptotic limits at aspect ratios of between 3:1 and 4:1 (Wahlgren & Nelson 1976a, Gardner 1977, 1980b). At greater horizontal velocities, aspect ratios may need to be increased to counter resuspension from the base of the trap

Particles accumulate in cylindrical traps largely as a result of fluid exchanges in the upper part of the trap, and not by direct settling (Peck 1972; Gardner 1977, 1980a; see also Bloesch & Burns 1980). The turbulence generated by the trap in flowing currents causes parcels of water to penetrate episodically into the more stagnant portions of the trap wherein the particles can settle. Although the rate of particle entry into, and removal from, the cylindrical trap is relatively greater under conditions of turbulent flow, final settlement nevertheless takes place in a region whose cross-sectional area is equal to that of the trap mouth.

Most of the other trap designs do not satisfy this condition, because the effective collecting area changes with current velocity and turbulence. Conical funnels consistently undertrap in turbulent flow, because the stagnant portions of the trap (in the bottom angle) are eliminated. The effective collecting area of the funnel varies between its mouth (in still water) and its neck (at high velocities), and the particles settling on the funnel walls are susceptible to scour and

resuspension (Pennington 1974, Gardner 1977, Hargrave & Burns 1979). Gardner has also shown that these phenomena may be reduced by the inclusion of grille-like baffles (e.g. Bascom 1977, Honjo 1978a), but the net effect of baffling is always dependent upon their size and aspect ratio as well as funnel size and design. Some workers have packed very narrow cylinders together (e.g. Rother & Fay 1977), but the assumption that the height/diameter ratio of baffles has the same effect as the aspect ratio of larger cylinders has not been adequately tested. Very narrow cylinders (< 40 mm) potentially underestimate the flux rate, but may collect significantly higher percentages of organic matter.

Traps in which the area of the aperture is markedly smaller than that of the body (e.g. the Tauber trap) tend to overtrap in relation to other designs (Pennington 1974, Gardner 1977, Reynolds 1979). Gardner's (1977) experiments showed clearly how displacement of particle-deficient water inside the trap could lead to exaggerated catches. If the floor of the trap, rather than its mouth, is used as the basis for calculating areal flux, the results are closer to those of cylinders (Hargrave & Burns 1979). Difficulty arises in the interpretation of catches under natural conditions of fluctuating turbulence and current velocity. Shallow or open traps ("basins") may also seriously underestimate net particle flux, owing to inadequate protection of settled material, which can be resuspended by vigorous turbulence.

Errors in trapping results can arise for many reasons which are not necessarily a consequence of trap design. Accidental flushing of the traps during retrieval may introduce or remove material, if adequate care is not taken, but it is not essential that the traps be covered if handling is smooth (Bloesch & Burns 1980): traps lifted or allowed to rise freely through the water column upon release from an anchor set up a 'bow wave' which protects the sediment inside the trap from strong mixing and resuspension. We have compared the catches after 7-14 days in open traps with those in traps stoppered during setting and lifting; no significant differences were detected (Reynolds & Wiseman unpublished). A critical point in retrieval is reached when the traps come to the water surface. Bobbing in the waves can cause resuspension of the entrapped material and, once the aperture is above water level, some spillage can occur. Lids are therefore preferable on free-rising traps used in open oceans, where some delay in their recovery from the water surface is inevitable.

Changes in the entrapped material may result from death and decomposition of living organisms, feeding and defaecation by larger animals, through direct mineralization of organic particles, or as a result of growth of attached plants and animals ("Aufwuchs") within the trap (see Bloesch & Burns (1980) for a full discussion). A shorter operating period (i.e. the time between setting and recovering the trap) is the most effective way of countering these problems but, for certain studies, the use of a suitable fixative can be recommended. Formaldehyde (Ahlgren 1972; Ferrante & Parker 1977), iodine (Rigler et al. 1974; Lastein 1976), chloroform (Kawacz 1969; Smetacek et al. 1978; Zeitschel et al. 1978), phenol (Matsuyama 1973) mercuric chloride (Hartwig 1976) and sodium azide (Honjo 1978a) are among the preservatives which have been used. Selection of a preservative should avoid known interferences to the proposed analyses (e.g. pH change, increase in organic carbon content). Reference chambers (e.g. Fuhs 1973; White & Wetzel 1973; Kimmel et al. 1977; Ravera & Viola 1977) or inverted "control" traps (Jones 1976) have been used to correct the measured particulate flux for Aufwuchs or other non-sedimented material, but in many cases, their inclusion is unnecessary.

Trap performance in lakes and coastal environments is frequently complicated by resuspension and secondary sinking of bottom deposits. This problem has yet to be overcome satisfactorily. Resuspension may be estimated from a vertical series of traps (e.g. Young & Rhoads 1971); Gasith (1975) compared degradation products of entrapped material with that in suspended and bottom material, in order to estimate the proportion of secondarily resuspended material in the trap.

TRAP PLACEMENT

It is obviously important that traps are replicated (though this is often impractical with large traps on deep-sea moorings) and the selection of several vertical and horizontal stations is desirable in many studies. Sites where anomalous results are likely (e.g. close to the bottom in shallow water, within Langmuir circulations or in persistent lateral currents) must be recognized and conditions monitored accordingly. The orientation and vertical position of traps should remain stable (see Gardner 1980a). The method of trap placement followed by the majority of workers is also the best : traps are fitted to frames or cages

suspended from fixed points on a cable, on which tension is provided by submerged flotation. A "lazy line" facilitates location and recovery of the trap in shallow water. More sophisticated electronic timers or acoustic releases are needed in deep oceans. Basic configurations are illustrated in Johnson & Brinkhurst (1971), Ansell (1974), Pennington (1974), Rowe & Gardner (1979) and Bloesch & Burns (1980). Placement directly on the bottom mud (e.g. Raymond & Stetson 1931; Reissinger 1932) or mooring to surface floats (e.g. Watanabe & Hayashi 1971) have been avoided in more recent studies. Traps have also been attached to free-drifting vehicles in some oceanic studies (e.g. Sholkovitz & Soutar 1975, Staresinic et al. 1978).

BIBLIOGRAPHIC COVERAGE

The bibliography includes all the published titles known to contain descriptions of studies involving the use of sediment traps, or analyses of data obtained in earlier studies. Some published papers and several unpublished theses which we have not seen are indexed, but published reports that are not readily obtainable, for instance, Mitjagina (1958) quoted by Ohle (1965), Burns (1977), Syvitski (1978) both quoted by Bloesch & Burns (1978), have been omitted. The bibliographic coverage is to the end of 1979, except that one or two key papers published in 1980 are included. The distinctions between sediment traps and remotely operated suspended sediment samplers (some of which are called "traps") on the one hand, and "traps" designed to catch fish, invertebrates, emerging insects on the other, are difficult to establish. The criteria which have ultimately determined the present selection were the particular analyses presented and their relevance or otherwise to the monitoring of particulate flux processes in aquatic systems.

ANNOTATIONS

We have attempted to present the abstracted information in a standardized form. Inevitably, it has been impossible to follow this throughout because different authors present details to differing extents. The following explanatory notes may be useful.

References are presented in standard form (author(s), date, title) and are arranged in strict alphabetical order of authors. Lower case letters are used to distinguish entries by the same author or group of authors published in the same year (e.g. : 1978a, 1978b). Abstracts and reports, though not considered primary references, have been included to provide information on the most recent work which has yet to be published. Certain titles carry an asterisk (*) to denote that trap performance has been calibrated against alternative methods or that different traps have been compared. The symbol (†) denotes papers which are, in our opinion, key references describing the use of traps or giving critical interpretations of results obtained.

Annotations are arranged in a standard order; numbers refer to the following features.

1 : *Location* refers not just to the geographical location of the study but the type of environment investigated : ocean, continental shelf, coastal habitats or lakes. "Small" lakes are < 1 km^2 in area; "shallow" lakes are < 10 m in depth. Brief morphometric data are noted for some sites (a = area, units stated; $\bar{z}$ = mean depth (m); z_m is the maximum depth).

2 : *Design*. Configuration of traps employed, classified according to whether they are cylinders, funnels, cylinders with funnel bases, wide-mouthed jars, traps whose mouth area is considerably smaller than that of the trap body ("body > mouth"), basins, segmented basins, or of unspecified configuration. Dimensions (a = mouth area, diam. = mouth diameter, ht. = height of trap) and details of baffling, lids, timing devices etc., are given where appropriate.

3 : *Placement* refers to the depths of installation and other operational details.

4 : *Analyses of Material* summarizes main analytical determinations. Most are concerned with the dry mass of particulate matter, its organic content or its elemental composition. In some studies specific particles (pollen grains, algae, crustaceans, faecal pellets) have been enumerated.

5 : *Operating Period*. The length of time between setting and recovering traps.

6 : *Study Period*. The length (or the calendar dates) of the project, or that part of it reported specifically in the paper.

7 : *Comments*. Any further remarks are added.

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We gratefully acknowledge the help of colleagues at the F.B.A. Windermere Laboratory in tracking down many of the references in the bibliography : Ms Deborah Powell, Mrs Doreen Horne, Mr I. Pettman and Dr K. Chambers. We also express sincere thanks to Dr N.M. Burns of the Canadian Centre for Inland Waters, Burlington, who kindly furnished us with a preprint of the critical review (Bloesch & Burns 1980), and to the British National Lending Library, Boston Spa, who provided books, reprints and photocopies for abstraction. Thanks are especially due to Dr J.W.G. Lund, F.R.S., who verified our abstracts of original works in Russian and Ukrainian, and Miss Joy Elsworth, who translated relevant passages from several of the papers in German. The tedious task of checking and editing the bibliography was eased by the assistance of Mr J.E.M. Horne, Joy Elsworth and Miss Elisabeth Evans; the typing of the draft and final manuscripts was skilfully undertaken by Elisabeth Evans and Mrs Joyce Hawksford; their contributions are also appreciatively acknowledged. The bibliography was prepared in partial fulfilment of a contract (DGR/480/310) awarded to the Freshwater Biological Association by the U.K. Department of the Environment.

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Ahlgren, I. (1972). Changes in Lake Norrviken after sewage diversion. *Verh. int. Verein. theor. angew. Limnol. 18*, 355-361.
1 : shallow lake (Sjön Norrviken, Sweden; a = 2.7 km^2; $\bar{z}$ = 5.4 m). 2 : funnels. 3 : spaced in epilimnion. 4 : seston (dry wt; elemental composition : C, N, P). 5 : 14-21 days. 6 : summer 1970. 7 : formaldehyde used in traps. Presented results from metalimnetic traps only.

Ahlgren, I. (1973a). Limnologiska studier av sjön Norrviken. III. Avlastningens effekter. *Scr. limnol. upsal. 9A* No. 333.
1 : shallow lake (Norrviken, Sweden). 2 : funnels. 3 : in epilimnion. 4 : C, N, P content. 5 : 14-21 days. 6 : summer 1970.

Ahlgren, I. (1973b). Limnological studies of Lake Norrviken, a eutrophicated Swedish lake. Nutrients and phytoplankton before and after sewage diversion. *Scr. limnol. upsal. 9A*, No. 334, 1-8.
1 : shallow lake (Norrviken, Sweden).
REVIEW of restoration work on Sjön Norrviken; cites evidence of sediment traps from Ahlgren (1972, 1973a).

Ahlgren, I. (1977). Role of sediments in the process of recovery of a eutrophicated lake. In : *Interactions between sediments and fresh water* (ed. H.L. Golterman), Junk-PUDOC., Den Haag, pp. 372-377.
1 : shallow lake (Norrviken, Sweden). 2 : cylinder. 3 : at 9 m (2 m above the bottom). 4 : phosphorus; particulate P. 5 : - 6 : 1973+.

Anderson, R.F., Bacon, M.P. & Brewer, P.G. (1979). Fluxes of thorium and protactinium measured in deep-sea sediment traps. *Trans. Am. geophys. Un. 60* (18), 282.
ABSTRACT ONLY. Baffled funnel (see Honjo 1978a) used to estimate isotope fluxes in North Atlantic.

*Anderson, R.Y. (1977). Short term sedimentation response in lakes in Western United States as measured by automated sampling. *Limnol. Oceanogr. 22*, 423-433.
1 : 4 lakes (El Vado L., Morgan L., New Mexico; L. Powell, Utah; and Pyramid L., Nevada, U.S.A.). 2 : cylinder with funnel bottom (baffled); automatic time marking device. 3 : 3 m above bottom. 4 : seston (organic content; $CaCO_3$; clay; silt). 5 : up to 10 days. 6 : July 1971 - 7 : trap design tested in laboratory tanks. Provision for layer separation by automatically-released marker layers of plastic granules.

Anderson, R.Y. & Nuhfer, E.B. (1979). Results of automated sampling of suspended sediment in lakes and reservoirs in the United States. *Geol. Soc. Am. Abstr. 11*, 379.
ABSTRACT ONLY. Paper discusses recent development in sediment traps, which authors consider adequate for the investigation of sedimentation processes.

*Ansell, A.D. (1974). Sedimentation of organic detritus in Lochs Etive and Creran, Argyll, Scotland. *Mar. Biol. 27*, 263-273.
1 : sea lochs (Argyll, Scotland, UK). 2 : wide-mouthed jar (diam. = 100 mm; ht. = 150 mm). 3 : jars at 6 depths from 10 m - 54 m below the surface in c. 60 m water. 4 : organic detritus (total volume; dry weight; carbon, nitrogen, chlorophyll and phaeophytin). 5 : - 6 : 1971. 7 : diver operated

Antsyferov, S.M., Kos'yan, R.D., Onishchenko, E.L. & Pykhov, N.V. (1977). On the possibility of measuring the concentration of suspended sediment in the sea with sampling bottles-accumulators. *Oceanology 17*, (6), 740-743. (Translation of *Okeanologiya 17*, (6), 1118-1122).
1 : inshore continental shelf (Baltic Sea, USSR) and laboratory flume. 2 : cylinders (diam. = 75 mm; ht. = 100 mm and diam. = 40 mm; ht. = 50 mm). 3 : - 4 : grain size. 5 : - 6 : - 7 : experimental study.

Axelsson, V. (1955). Rapaälven, dess delta samt sedimentationen i Laitaure. Ett Preliminärt meddelande. *Ymer, 75*, (1) 52-59.
1 : lake (Laitaure, Sweden). 2 : basin. 3 : on the lake bottom at stations of increasing distance from inflow delta (R. Rapaälven). 4 : monthly. 5 : 1 year (1954). 6 : sediment volume and deposition rate.

Axelsson, V. & Håkanson, L. (1975). The relation between mercury distribution and sedimentological environment in Lake Ekoln. Part 4. Deposition of sediment and mercury in 1971 and 1972. *Univ. Uppsala UNGI Rapp. 35*, 42pp.
1 : lake (Ekoln, Uppsala, Sweden; a = 18.6 km^2). 2 : basin (of Håkanson, 1976, q.v.). 3 : traps on lake bottom at 18 stations. $\bar{z}$ = 19 m. 4 : seston (weight; mercury content; % organic content). 5 : 13 weeks. 6 : 2 yrs: 1971-72. 7 : numerous surface sediment samples taken in earlier study.

Bachofen, R. (1960). *Stoffhaushalt und Sedimentation im Baldegger- und Hallwilersee*. Zürich Univ. Inaugural - Dissertation. pp. 118.
1 : lakes (Baldeggersee, z_m 67 m; Hallwilersee, z_m 48 m : Luzern, Switzerland). 2 : basin; as Thomas (1950) q.v. 3 : 20 m below surface. 4 : seston (organic; N, P content). 5 : monthly. 6 : Sept. 1957 - Dec. 1959.

Bascom, W. (1977). Instruments for studying ocean pollution. *J. envir. Engng Divn, ASCE 103*, 1-8.
1 : open coastal waters, z_m < 200 m. 2 : funnel (baffled), aperture 300 mm x 300 mm square. 3 : on tripod, at bottom, upward opening or suspended from surface buoy (downward opening). 4 : seston. 5 : 12 hours ; 2 weeks. 6 : - 7 : modified from design by A. Soutar. Suggested use in sewage treatment plants, measuring upward and downward movement.

Basinski, T. & Lewandowski, A. (1975). Field investigations of suspended sediment. *Coastal Engng Conf. 14th int. Proc. 2*, 1096-1108.
1 : inshore surf zone of Continental Shelf (Baltic Sea, near Poland; also Mediterranean Sea, Libya). 2 : tube (int. diam. = 40 mm; ht. = 3-4 m) comprising of separated divisions, each 200 mm long with two openings (10 mm x 50 mm). 3 : loosely in vertical profile in about 6 m of water. 4 : weight of sand at different depths to investigate transport mechanisms. 5 : 5 - 7 days. 6 : 1973. 7 : trap based on "Bamboo Traps" of Fukushima, H. et al. (1958).

†Bennett, J.T. (1978). The role of zooplankton faecal pellets in the sedimentary cycle of Dabob Bay, Wash. *Abstr. 25th Pacific Northwest Regional Meeting of Am. geophys. Un.*
1 : bay (Puget Sound, Washington, U.S.A.). 2 : cylinder (diam. = 150 mm; ht. = 450 mm). 3 : 50-60 m above bottom. z_m = 110 m. 4 : dry wt.; Al; C; faecal pellet counts and composition. 5 : 3-7 weeks. 6 : 1977-1978. 7 : accumulation rates in traps were very close to accumulation rates of Pb-210 and Al in sediments.

Bennett, J.T. (1979). *The role of zooplankton faecal material in the cycling and deposition of particulate matter in an estuarine and deep-oceanic region of the N.E. Pacific Ocean.* Ph.D. Thesis, Univ. of Washington, Seattle.
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Berger, W. & Soutar, A. (1967). Planktonic Foraminifera : field experiment on production rates. *Science, N.Y. 156*, 1495-1497.
1 : continental shelf (near Santa Barbara, California coast, U.S.A.). 2 : umbrella-shaped free vehicle with 0.7 m^2 max. aperture. 3 : 6 m above bottom. 4 : counts of Foraminifera. 5 : 4 days. 6 : 1966. 7 : automatic opening, closing and release.

Birch, P.B. (1974). *Sedimentation in lakes of the Lake Washington drainage basin.* M.S. Thesis, Univ. of Washington, 163pp.
NOT SEEN.

Bloesch, J. (1967). *Messung der sedimentation in verschiedenen Tiefenstufen des Vierwaldstättersees (Horwer Bucht) mit besonderer Berucksichtigung des Phosphors.* M.S. Thesis, Fed. Polytech. Inst., Zürich, 103pp.
NOT SEEN.

Bloesch, J. (1974). Sedimentation und Phosphorhaushalt im Vierwaldstättersee (Horwer Bucht) und im Rotsee. *Schweiz. Z. Hydrol. 36*, 71-186.
1 : lakes (Vierwaldstättersee, Rotsee, Switzerland). 2 : cylinder (diam. = 140 mm; ht. = 500 mm). 3 : trap depth detween 2.5 m and 60 m. 4 : seston (weight; chemical composition). 5 : - 6 : 1969 -1970. 7 : possible exaggeration of trap catches. Some rates of sinking of specific particles calculated.

Bloesch, J. (1977). Sedimentation rates and sediment cores in two Swiss lakes of different trophic state. In : *Interactions between sediments and fresh water* (ed. H.L. Golterman). Junk-PUDOC, Den Haag, pp. 65-71.
1 : lakes (Rotsee, a = 0.47 km^2, $\bar{z}$ = 9 m; and Vierwaldstättersee, a = 1.69 km^2, $\bar{z}$ = 42.6 m; both Switzerland). 2 : cylinder (of Bloesch, 1974). 3 : as Bloesch (1974). 4 : planktonic and chemical composition : total organic substances, organic carbon, clay minerals, Ca, Mg, P, N, Fe, Mn. 5 : - 6 : 1969-1970.

*†Bloesch, J. & Burns, N.M. (1980). A critical review of sedimentation trap technique. *Schweiz. Z. Hydrol. 42*, (in press).
REVIEW of the published literature on the use of sediment traps, and demonstrates on both practical and theoretical ground that high-aspect ratio cylindrical traps probably give the most accurate results. Compulsory reading by all about to commence a sediment trapping programme, or to analyze or interpret their results!

Bloesch, J., Stadelmann, P. & Bührer, H. (1977). Primary production, mineralisation, and sedimentation in the euphotic zone of two Swiss lakes. *Limnol. Oceanogr. 22*, 511-526.
1 : lakes (Horwer Bucht, Vierwaldstättersee and Rotsee, Switzerland). 2 : cylinder : as Bloesch (1974). 3 : - 4 : seston (dry wt.; total N; organic C; total P) counts of phytoplankton. 5 : 2 weeks. 6 : 1 yr. 7 : Quantitative estimate of error attempted.

Bombowna, M. (1962). Sedimentieren von Sinkstoffen im Staubecken - Goczalkowice. *Acta Hydrobiol., Krakow, 4*, 69-118.
1 : reservoir (Goczalkowice, Poland. z_m = 12 m; a = 692 km^2). 2 : wide-mouthed jars (23 cm^2) in batches. 3 : upper set 2.5 m below water surface, lower set 2.5 m above bottom in 12 m of water. 4 : sediment volume; dry weight; organic content; semiquantitative algal data and seasonal distribution of catches. Also lists funnel recoveries. 5 : monthly. 6 : 1957-1959. 7 : one jar removed each month.

Bonny, A.P. (1976a). Recruitment of pollen to the seston and sediment of some Lake District lakes. *J. Ecol. 64*, 859-887.
1 : lake (Ennerdale Water, $\bar{z}$ = 17.8 m) and small, shallow lake (Blelham Tarn, Cumbria, U.K. : $\bar{z}$ = 6.8 m). 2 : cylinders (diam. = 70 mm; ht. = 250 mm). 3 : in pairs 2 m above mud, 2 m below water surface. 4 : seston; pollen. 5 : 1-3 months. 6 : Apr. 70 - Nov. 73.

Bonny, A.P. (1976b). *Recruitment of contemporary pollen grains to the sediments of Blelham Tarn, Cumbria*. Ph.D. Thesis, Univ. of Leicester.
1 : small, shallow lake (Blelham Tarn, Cumbria, U.K. : a = 0.7 km^2 $\bar{z}$ = 6.8 m). Also in inflow stream. 2 : cylinder (diam. = 70 mm; ht. = 250 mm) trap. 3 : in pairs at 2, 6.5 and 10 m in 11.6-11.8 m of water. 4 : seston; volume; pollen counts. 5 : 4-6 weeks. 6 : 1970-1974. 7 : main body of data summarized in Bonny (1976a) and (1978).

†Bonny, A.P. (1978). The effect of pollen recruitment processes on pollen distribution over the sediment surface of a small lake in Cumbria. *J. Ecol. 66*, 385-416.
1 : small, shallow lake (Blelham Tarn, Cumbria, U.K. : a = 0.7 km^2; $\bar{z}$ = 6.8 m). Also in inflow stream (Ford Wood beck). 2 : cylinders (as Bonny 1976a) and body > mouth (Tauber Trap : see Peck, 1972). 3 : in pairs at 2, 6.5 and 10 m below surface. 4 : pollen counts; seston. 5 : 4-6 weeks. 6 : > 1 yr. 7 : floating trap used to estimate airborne pollen flux to lake surface.

Braidech, T., Gehring, P. & Kleveno, C. (1972). Biological studies related to oxygen depletion and nutrient regeneration processes in the Lake Erie Central Basin. In : *Project Hypo : An intensive study of the Lake Erie Central Basin hypolimnion and related surface water phenomena* (ed. N.M. Burns & C. Ross), CCIW, Paper No. 6 U.S. Envir. Prot. Agency, Tech. Rep., T5-05-71-208-24, Febr. 1972, pp. 51-70.
Reference from Bloesch & Burns (1980).
NOT SEEN.

Brewer, P.G., Nozaki, Y. & Spencer, D.W. (1979). The chemical composition of sediment trap samples from the equatorial Atlantic Ocean. *Trans. Am. geophys. Un. 60*(18), 297.
ABSTRACT ONLY.

1 : ocean (North Atlantic, 13°30'N, 54°W). 2 : baffled funnel (see Honjo, 1978a). 3 : at 389, 988, 3755 and 5086 m below surface in 5288 m depth. 4 : Si, Al, Ca, Mg, Mn, Fe, K, Ba, Ti, Sr, Cu, V, I, La, Sc, and Co. 5 : 98 days. 6 : Nov. 1977+.

Brewer, P.G., Spencer, D.W., Honjo, S., Fleer, A., Krishnaswami, S. & Nozaki, Y. (1978). Chemical fluxes from sediment traps in the deep Sargasso Sea. *Trans. Am. geophys. Un. 59*, 299.
1 : ocean (Sargasso Sea, Atlantic Ocean). 2 : funnel (with baffling - see Honjo 1978a) (a = 1.5 m^2). 3 : traps at 5367 m in 5581 m of water. 4 : elemental composition : Si, Al, Ca, K, Mg, Fe, Mn, Ba, Sr, Ti, V, I, Sc, La, Cr, Sb, Cu, Zn, Cd, Ni, Co; radioisotopes; organic matter; $CaCO_3$; clay; silt. 5 : 75 days. 6 : Oct. 1976 - Jan. 1977.

Brockel, K. von (1975). *Der Energeifluss im pelagischen Ökosystem vor Boknis Eck. (Westl. Ostsee)*. Dissertation. Univ. of Kiel. 96pp.
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Bruland, K.W. & Coale, K.H. (1979). Particulate fluxes in the northeast Pacific as determined by sediment traps and uranium/thorium series radionuclides. *Int. Un. Geod. Geophys., Abstr. Canberra Meeting 1979*.
ABSTRACT ONLY. Use of Soutar et al. (1977) design to measure particle flux from euphotic zone.

Brunskill, G.J. (1969). Fayetteville Green Lake, New York. III: Precipitation and sedimentation of calcite in a meromictic lake with laminated sediments. *Limnol. Oceanogr. 14*, 830-847.
1 : small meromictic lake (Fayetteville Green Lake, N.Y., U.S.A.). 2 : funnel (diam. = 150 mm; slope 45°) attached to tube (diam. = 21 mm; ht. = 320 mm). 3 : 22 and 50 m below surface (near bottom). 4 : dry wt; $CaCO_3$. 5 : 6 months. 6 : Mar. 1966 - June 1967. 7 : SCUBA divers inspected 22 m trap.

Bürgi, H.R., Bührer, H., Bloesch, J. & Szabo, E. (1979). Der Einfluss experimentell variierter Zooplanktondichte auf die Produktion und Sedimentation im Hocheutrophen See. *Schweiz Z. Hydrol. 41*, 38-63.
Sediment collected at the base of experimental 2.5 m^3 containers in short term manipulations of natural plankton communities.

Burns, N.M. & Pashley, A.E. (1974). In situ measurement of the settling velocity profile of particulate organic carbon in Lake Ontario. *J. Fish. Res. Bd Can. 31*, 291-297.
1 : lake (Ontario, Canada). 2 : settling velocity bottle (based upon van Dorn sampling bottle). cross-sectional area = 100 cm^2; 1 m long which can be divided into upper and lower half. 3 : not applicable. 4 : distribution of POC. 5 : <12 h. 6 : - 7 : information on settling flux and velocities, but *not* a sediment trap in the strictest sense.

Campbell, P. (1976). *Descriptive limnology of lake 120, a meromictic lake on the Precambrian Shield in north-western Ontario.* M.Sc. Thesis, Univ. of Manitoba, Winnipeg, Manitoba, Canada. 118pp. and Data Appendix 122pp.
NOT SEEN.

†Chalupa, I. & Vorderwinklerova, H. (1959). Limnologicheskoe issledovanie vodokhranilishcha Sedlitse, bliz Zheliva. IV. Izyuchenie protsessov sedimentatsii. *Sb. vys. Sk. chem. technol. Praze 3*(2), 167-219.

1 : reservoir (Sedlice, Zeliv, Czechoslovakia). 2 : cylinders (diam. = 195 mm; ht. = 400 mm) placed singly on reservoir bottom at seven separate stations. 4 : 'seston' (wet weight; dry weight; inorganic and organic fractions; carbon; nitrogen). 5 : 27-188 days. 6 : 1954-1956. 7 : a thorough presentation of all relevant data trap-by-trap, period-by-period and determinand-by-determinand. Variations in trap catches are compared both seasonally and in relation to distribution.

Chambers, K.C. (1978). *Source-sediment relationships in the Cumbrian Lakes*. Ph.D. Thesis, Univ. of Reading.
1 : small lake (Brotherswater, Cumbria, U.K.; a = 0.19 km^2). 2 : cylinders (as Pennington, 1974) and cylinders (as Chambers and Parker, 1979). 3 : traps placed 2 m above mud surface and 2 m below water surface. 4 : seston (wet volume; dry wt; particle size; organic components and mineralogical content). 5 : 1-7 months. 6 : 1976-1977.

Chambers, K.C. & Parker, A. (1979). Short communications. A modified design for lake-seston traps and a simple method for relocating them. *Earth Surface Processes 4*, 73-76.
1 : small lake (Brotherswater, Cumbria, U.K. a = 0.19 km^2). 2 : cylinders. (diam. = 90 mm; ht. = 150 mm). with flange around rim and cylinders as in Pennington (1974) q.v. 3 : paired traps placed 2 m above mud surface. 4 : seston (wet vol.; dry wt; particle size; organic and mineralogical content). 5 : 4 monthly. 6 : 1977. 7 : traps designed to collect larger quantities of seston than conventional traps.

Charlton, M.N. (1975). Sedimentation : measurements in experimental enclosures. *Verh. int. Verein. theor. angew. Limnol. 19*, 267-272.
1 : within experimental enclosures (limnocorrals) in lake (Bay of Quinte, L. Ontario Canada). 2 : cylinder (diam. = 100 mm; ht. = 250 mm). 3 : in <4 m of water. 4 : dry wt; total C, P, N; inorganic C, P, N; trace metals; wt. loss on ignition. 5 : 3-4 days. 6 : -

Cobler, R. (1979). Sediment trap experiment at the Galapagos spreading center. *Int. Un. Geod. Geophys., Abstr.* Canberra Meeting, 1979.
ABSTRACT ONLY. Oceanic deployment of 1 m^2 box with baffles to determine fluxes of 35 elements.

Cobler, R. & Dymond, J. (1977). Sediment trap experiment at the Galapagos spreading center : Preliminary results. *Trans. Am. geophys. Un. 58*, 1172.
ABSTRACT ONLY. 1 : ocean (Galapagos Rift : 0^o 35.75'N, 86^o 05.66'W). 2 : box (1 m x 1 m; ht. = 600 mm) with baffles. a = 1 m^2. 3 : water depth = 2670 m. Trap at 20 m and 100 m above bottom. 4 : wt; $CaCO_3$; SiO_2; Al, Ba; organic carbon. 5 : 234 days. 6 : -

Cowell, B.C. & Hudson, P.L. (1968). A device for determining sedimentation rates in reservoirs. *Limnol. Oceanogr. 13*, 196-198.
1 : unnamed reservoir. 2 : cylinder with funnel bottom (surface area = 100 cm^2) attached to steel ring for attachment of floats. Remote opening and closing. 3 : unspecified: can be operated "at a desired depth". 4 : - 5 : 24-48 hrs. 6 : - 7 : current is major factor limiting the use of this device.

*Davies, J.M. (1975). Energy flow through the benthos in a Scottish sea loch. *Mar. Biol. 31*, 353-362.
1 : sea loch (Thurnaig, Scotland, U.K., z_m = 30 m). 2 : cylinders (diam. = 100 mm; ht. = 300 mm). 3 : 17 m, 10 m and 0 m above bottom. 4 : total pigment; chlorophyll a; organic C, and N; microscopic examination. 5 : monthly. 6 : > 1 yr. 7 : differentiated between fresh and resuspended material. Trap designed for use in deep water.

Davies-Colley, R.J. (1977). Some field techniques used in a study of Tauranga Harbour. *Proc. N.Z. ecol. Soc. 23*, 33-37.
1 : tidal inlet (Tauranga Harbour, Auckland Prov., N.Z.). 2 : basin (diam. = c. 250 mm; ht. = c. 200 mm). Slot aperture. If buried in sand by SCUBA diver, current-moved sediment is trapped. If resting on bottom, tide-borne suspended sediment is caught. Later designs incorporate automatic operation (see Davies-Colley, R.J. & Healy, T.R. 1978). 4 : weight of sediment. 5 : ½ tidal cycle. 6 : 1974 - 1975. 7 : SCUBA divers needed for installation and recovery for some traps.

Davies-Colley, R.J. & Healy, T.R. (1978). Sediment transport near the Tauranga entrance to Tauranga harbour. *N.Z. Jl mar. Freshwat. Res. 12*, (3), 237-243.
1 : tidal inlet linking lagoon to sea. (Tauranga Harbour, Auckland Prov. N.Z.). 2 : basin. 3 : traps rest on or buried in the sand by SCUBA diver. Describes in detail the later design of Davies-Colley (1978). Tidal current acts on dividing vane to separate catches. 4 : weight of sediment. 5 : 2 tidal cycles. 6 : 1974 - 1975. 7 : traps installed by divers, but operate over full tidal cycle or longer : trap separates ebb from flow-tide collections.

Davis, M.B. (1965). Sediment traps for measuring pollen deposition. *Publs. gt. Lakes Res. Inst. No. 13*, p. 248.
ABSTRACT ONLY. 2 : wide-mouthed jars. 3 : in wire-mesh cages held "a short distance above lake bottom".

†Davis, M.B. (1967). Pollen deposition in lakes as measured by sediment traps. *Bull. geol. Soc. Am. 78*, 849-858.
1 : lake (Echo L., z_m = 40 m), shallow lake (Brownington Pond, z_m = 8 m) and reservoir (Quabbin), Vt and Mass., U.S.A. 2 : wide-mouthed jars (diams. = 82 mm and 108 mm). 3 : 2 m above bottom in mesh cages. 4 : pollen count. 5 : - 6 : > 1 yr. 7 : trap efficiency tested in the laboratory, using various mouth diameters : catches proportional to mouth area.

Davis, M.B. (1968). Pollen grains in lake sediments : Redeposition caused by seasonal water circulation. *Science, N.Y. 162*, 796-799.
1 : small, shallow lake (Frains, Mich., U.S.A., z_m = 9.5 m). 2 : wide-mouthed jars (larger size of Davis, 1967). 3 : 2 m above lake bottom. 4 : pollen. 5 : - 6 : -

Davis, M.B. (1973). Redeposition of pollen grains in lake sediment. *Limnol. Oceanogr. 18*, 44-52.
1 : small, shallow lakes (Frains L., z_m = 9.5 m; Sayles L., z_m = 3 m; both Mich., U.S.A.). 2 : wide-mouthed jars (as Davis, 1967 : a = 54-90 cm^2). 3 : 2 m above mud surface or vertical series, (in Frains Lake) and 0.5, 1.5 m above bottom (in Sayles Lake). 4 : pollen. 5 : monthly +. 6 : 1965-1966.

Davis, M.B. & Brubaker, L.B. (1973). Differential sedimentation of pollen grains in lakes. *Limnol. Oceanogr. 18*, 635-646.
1 : small, shallow lake (Frains L., Mich., U.S.A.) z_m = 9.5 m. 2 : wide-mouthed jars, plastic : a = 54 cm^2. 3 : traps at three stations (in 2, 4 and 8 m depth). Vertical series of 2 m intervals, starting 1 m above bottom in each case. 4 : pollen; seston (dry wt.; ash wt.). 5 : 3 weeks. 6 : Aug. + Sept. 1968.

Deevey, E.S. (1964). Preliminary account of fossilization of zooplankton in Rogers Lake. *Verh. int. Verein. theor. angew. Limnol. 15*, 981-992.
1 : lake (Rogers L., Conn., U.S.A.; a = 1.07 km^2; z_m = 20 m; $\bar{z}$ = 5.9 m). 2 : wide-mouthed jars, polyethylene; a = 23 cm^2. 3 : suspended 1 m off bottom, paired at 3 adjacent stations at 14-15 m depth. 4 : seston (organic); zooplankton; microfossils; total organic matter. 5 : 151-336 days. 6 : 1961-1962. 7 : animal settling rates computed, on annual basis.

Deevey, E.S., Vaughan, H. & Deevey, G.B. (1977). Lakes Yaxha and Sacnab, Peten, Guatemala : Planktonic fossils and sediment focussing. In : *Interactions between sediments and fresh water* (ed. H.L. Golterman), Junk-PUDOC, Den Haag, pp. 189-196.
1 : lakes (L. de Yaxha, $\bar{z}$ = 7.4 m and L. de Sacnab, $\bar{z}$ = 6.5 m; both Guatemala). 2 : cylinders. (a = 11.34 cm^2). 3 : 1 m off the bottom. 4 : microfossil counting; sedimentation rate. 5 : 67-268 days. 6 : 1973-1974.

Deuser, W.G. (1979). Seasonal changes in isotopic and species composition of Foraminfera collected in a deep-water sediment trap. *Geol. Soc. Am., Abstr. 11*, 412.
ABSTRACT ONLY. Ocean deployment of traps of unspecified configuration in investigation of deposition of carbonate by Foraminifera.

Deuser, W.G. & Ross, E.H. (1980). Seasonal change in the flux of organic carbon to the deep Sargasso Sea. *Nature, Lond. 283*, 364-365.
1 : ocean (Sargasso Sea, 25 miles south east of Bermuda). 2 : funnel (with baffles, diam. = 1.38 m). 3 : 1000 m above bottom, in 3200 m depth. 4 : organic carbon. 5 : 60-68 days. 6 : April 1978 - July 1979. 7 : shows seasonal variation in organic carbon flux to deep sea.

Ditchburn, R.G. & McCabe, W.J. (1977). Sedimentation rates in Lake Pukaki, New Zealand. *INIS Atomindex, 9*(22), (1978), Abst No. 410870.
ABSTRACT ONLY. The rate of sediment deposition checked against radionuclide and related to "known input pattern".

Dörrstein, D. (1977). *Sedimentation im Piburger See (Otztal, Tirol)*. Ph.D. Thesis, Univ. of Innsbruck, 118pp.
NOT SEEN.

Dunbar, R.B. & Berger, W.H. (1979). Faecal pellet flux in Santa Barbara Basin (California) based on sediment trapping. *Geol. Soc. Am. Abstr. 11*, 416.
ABSTRACT ONLY. Use of "suitcase-type sediment trap" (sic) in Santa Barbara basin, as part of a calibration experiment. See also Dymond et al. (1979).

*Dymond, J., Gardner, W.D., Berger, W. & Soutar, A. (1979). Sediment trap intercomparison in the Santa Barbara Basin - MANOP. *Trans. Am. geophys. Un. 60*(46), 851.

ABSTRACT ONLY. 1 : continental shelf (Santa Barbara Basin, Calif., U.S.A.). 2 : box (1 m square; ht. = 600 mm); cylinder (diam. = 250 mm; ht. = 620 mm); "suitcase" with 4, 0.17 m^2 square chambers with baffles; paired funnels (diam. = 570 mm; ht. = 1200 mm). 3 : between 150-400 m, z_m = 550 m. 4 : dry wt.; $CaCO_3$; organic C; Al, Ca, Mg, Mn, Ba, Ti, Sr, Cu, V. 5 : 48 days. 6 : spring 1978. 7 : calculated flux only varied by a factor of two, between traps of radically different designs.

Edmondson, W.T. & Winberg, G.G. (1971). *A manual on methods for the assessment of secondary productivity in fresh waters.* IBP Hb. No. 17. Blackwell, Oxford. pp.354.
REVIEW. Description of range of trap designs available, and the means of placement. 8 references.

Edwards, R.R.C. (1973). Production ecology of two Caribbean marine ecosystems. II. Metabolism and energy flow. *Estuar. coastal Mar. Sci. 1*, 319-333.
1 : continental shelf (San Luis and Las Maritos, Caribbean). 2 : wide-mouthed jars, sealed on bottom before being raised. 3 : 200 mm above bottom. 4 : plankton; detritus; faecal pellets; dry wt.; C; inorganic ash. 5 : 6 days. 6 : May - Sept.

Eggleton, F.E. (1931). A limnological study of the profundal bottom fauna of certain freshwater lakes. *Ecol. Monogr. 1*, 231-331.
1 : lake (Third Sister L., Mich., U.S.A.). 2 : glass containers of unknown configuration. 3 : on the firm-mud bottom. 4 : seston. 5 : - 6 : 1926-1928

Ellis, J.E. & Tacket, D.L. (1977). Cones for sampling accumulated solids in ponds. *Progve Fish-Cult. 39*(66).
1 : fish ponds. 2 : funnels (diam. = 350 mm; ht. = 290 mm). 3 : rigidly (to stake) 0.6 m below surface. 4 : none presented. 7 : the apparatus is evacuated *in situ* by hand-operated pump and hose to funnel base. The system is described as a 'sampler', but sedimented material is drawn off first.

Emery, K.O., Trace, J.I. & Ladd, H.S. (1954). Geology of Bikini and nearby atolls. *Prof. Pap. U.S. geol. Surv. 260-A*, 1-265.
1 : lagoon (Bikini Atoll, West Pacific). 2 : basin (diam. = 350 mm; overall ht. = 102 mm) with grille-baffle, at base of trap. 3 : directly on sediments. 4 : volume; dry weight. 5 : - 6 : -

Emery, R.M. (1978). A theoretical expression for resuspension applied to sedimentation processes in lakes. *Verh. int. Verein. theor. angew. Limnol. 20*, 1255-1258.
A completely theoretical approach to the design and use of sediment traps, with special reference to the distinction between material settling for the first time and material secondarily resuspended from the benthos and settling again.

Eppley, R.W., Koeller, P. & Wallace, G.T. (1978). Stirring influences the phytoplankton species composition within enclosed columns of coastal sea water. *J. exp. mar. Biol. Ecol. 32*, 219-239.
1 : CEE (62 m^3), (in Saanich Inlet, B.C., Canada). 2 : funnel (255 mm). 3 : suspended singly 13 m below surface. 4 : volume. 5 : daily. 6 : August-October (incl.) 1976.

Erdtman, G. (1950). Discussion. *Proc. 7th int. bot. Congr., Stockholm*, 882-883.
1 : bay (Bornö, Baltic). 2 : unknown configuration. Apparatus 15 m below sea level. 4 : pollen. 5 : - 6 : June 1947-49. 7 : no. collected = 80 mm^{-2} $year^{-1}$.

Erez, J., Honjo, S. & Shackleton, N.J. (1979). Isotopic composition of planktonic Foraminifera in plankton tows, sediment traps and sediments. *Geol. Soc. Am. Abstr. 11*, 421.
ABSTRACT ONLY. Brief mention of recovery of Foraminifera in deep sediment traps (see Honjo, 1978a).

Fallon, R.D. (1978). *The planktonic cyanobacteria : their sedimentation and decomposition in Lake Mendota, WI.* Ph.D. Thesis, Univ. Wisconsin, Madison. 442p.
NOT SEEN.

Fallon, R.D. & Brock, T.D. (1980). Planktonic blue-green algae : Production, sedimentation and decomposition in Lake Mendota, Wisconsin. *Limnol. Oceanogr. 25*, 72-88.
1 : lake. 2 : cylinder with funnel at base (diam. = 100 mm, ht. = 430 mm). 3 : 2 m above bottom. 4 : seston (chlorophyll a; carbohydrate; carbon; algal volume). 5 : 4-14 days. 6 May 1976 - Dec. 1977. 7 : primary production and respiration measured during study.

Ferrante, J.G. & Parker, J.I. (1977). Transport of diatom frustules by copepod faecal pellets to the sediments of Lake Michigan. *Limnol. Oceanogr. 22*, 92-98.
1 : lake (Michigan, U.S.A.). 2 : cylinder, ht./diam. ratio = 14. 3 : duplicate traps suspended at 37-60 m in 67 m of water, and at 50 and 100 m in 110 m of water. 4 : zoodetritus. 5 : monthly. 6 : - 7 : trap contained 250 ml formalin. Faecal pellets also collected with towed net.

Fischer, K. & Cobler, R. (1979). Antibiotic poisoning of sediment trap. *Trans. Am. geophys. Un. 60*(46), 851.
ABSTRACT ONLY. Use of antibiotic poisons reduced organic decomposition of trapped material in funnel traps.

Fitzgerald, M., Milliman, J.D., Orr, M. & Bothner, M. (1979). Source and fate of urban estuarine sediments - Boston Harbour. *Geol. Soc. Am. Abstr. 11*, 426-427.
ABSTRACT ONLY. Cylinders with 3:1 height:width ratio with funnel at the bottom.

Fuhs, G.W. (1973). Improved device for the collection of sedimenting matter. *Limnol. Oceanogr. 18*, 989-993.
1 : lake (Canadarago L., N.Y., U.S.A.). 2 : cylinder. (diam. = 115 mm ht. = 400 mm). Modified Van Dorn sampler with internal septum. 3 : 2 m from bottom. Max. operating depth = 12 m. 4 : seston (total phosphorus; nitrogen and carbon; calcium and iron). 5 : 2 weeks. 6 : 1969. 7 : septum in the cylinder separates collecting and reference compartments.

Fukushima, H. & Mizoguchi, Y. (1958). Field investigation of suspended littoral drift. *Coastal Engng Japan 1*, 131-134.
1 : inshore continental shelf (Hokkaido, Japan). 2 : bamboo poles with holes (50 mm length x 5 mm breadth) down the length (5 m).

3 : in up to 10 m water, anchored in bottom. 4 : seston; dry weight (dessication). 5 : 1 week. 6 : 1954. 7 : used in the investigation of tidal transport mechanisms.

Gardner, W.D. (1977). *Fluxes, dynamics and chemistry of particulates in the Ocean*. Ph.D. Thesis, MIT/Woods Hole Oceanogr. Inst. 405 pp.
1 : ocean (North Atlantic; three stations, between 38°-39°N, 69-73°W); Laboratory flumes (MIT); harbour, pond. 2 : cylinders : (diam. = 250 mm; ht. = 760 mm), with remote closing and release mechanism. 3 : singly at 3 depths varying from 18-518 m above bottom in < 3580 m depth. Also in free drifting arrays at 40 and 100 m below surface. 4 : suspended matter; dry weight; particle size; carbonate; C, N, Ca, Al, Mg, Mn, Ba, Ti, Sr, Cu, V, I. 5 : 5-16 days. 6 : summer, 1976. 7 : thesis contains an extensive laboratory and field evaluation of several designs of sediment trap (also in Gardner 1980a) and a bibliographic survey (105 titles). Study of primary material from surface waters and resuspended sediment.

Gardner, W.D. (1978). Composition of large-particle flux and resuspended material in the North Atlantic. *Trans. Am. Geophys. Un. 59*, p. 299.
ABSTRACT ONLY. 1 : ocean (3 stations). 2 : cylinder (diam. = 250 mm, ht. = 760 mm). 3 : singly at 3 depths from 18-518 m above bottom in 2220-3580 m. 4 : carbonate; C, N, Ca, Al, Mg, Mn, Ba, Ti, Sr, Cu, V, I. 5 : 5-16 days. 6 : summer 1976. 7 : comparison of particles in traps on sea floor and in suspension.

Gardner, W.D. (1979). Sediment traps as measurers of vertical flux. *Abstr. 42nd Ann. Mtg Am. Soc. Limnol. Oceanogr.*
ABSTRACT ONLY. 1 : laboratory, harbour, pond (Woods Hole, Mass., U.S.A.). 2 : variety of designs : plates, cylinders, wide-mouthed jars, flasks, funnels. 3 : in flume, and 3-9 m below surface. 4 : dry wt. and particle size. 5 : up to 2 days. 6 : 1975-1976. 7 : film made showing flow of dyed water around traps.

*†Gardner, W.D. (1980a). Sediment trap dynamics and calibration : a laboratory evaluation. *J. mar. Res. 38*, 17-39.
1 : laboratory study (Massachusetts Institute of Technology, U.S.A.). 2 : variety of designs - plates, cylinders, wide-mouthed jars, funnels, narrow-necked jars. 4 : dry wt.; particle size. 5 : up to 1 day. 6 : 1975. 7 : flow dynamics and particle trapping characteristics of various design of traps were investigated. Films were made showing flow of water around traps. Shows the importance of trap geometry on collection rate.

*†Gardner, W.D. (1980b). Field assessment of sediment traps. *J. mar. Res. 38*, 41-52.
1 : harbour, pond (Woods Hole, Mass., U.S.A.). 2 : cylinder. (diam. = 250 mm; ht. = 760 mm). Other sizes, with differing aspect ratios, funnels and flasks were also tested. 3 : on 1 m cross bars at 3.3 - 6.9 m below water surface. 4 : seston (dry wt.; particle size). 5 : 18-48 hrs. 6 : 1976. 7 : SCUBA divers replace lids before retrieval. Particle size collected was a function of trap geometry.

Gardner, W.D., Rowe, G.T., Williams, A.J. & Hollister, C.D. (1977). Particle residence time in an oceanic nepheloid layer and total particulate flux. *Trans. Am. geophys. Un. 58*, 410 (Abstract).

1 : ocean (Western North Atlantic). 2 : cylinder (diam. = 250 mm; ht. = 760 mm). 3 : above and within nepheloid layer at 2200 m, 2800 m and 3600 m. 4 : grain size; organic carbon; % carbonate; morphology. 5 : 5-16 days. 6 : summer 1976.

Gasith, A. (1975). Tripton sedimentation in eutrophic lakes - simple correction for the resuspended matter. *Verh. int. Verein. theor. angew. Limnol. 19*, 116-122.
1 : shallow lake (Wingra, Wisc., U.S.A.; a = 1.4 km^2; $\bar{z}$ = 2.4 m). 2 : cylinder (diam. = 80 mm; ht. = 170 mm). 3 : in triplicate, at two stations each 0.5 m above the bottom in about 3.5 m depth. 4 : tripton (dry weight; organic content). 5 : 1-7 days. 6 : 1973.

Gasith, A. (1976). Seston dynamics and tripton sedimentation in the pelagic zone of a shallow eutrophic lake. *Hydrobiologia 51*, 225-231.
1 : shallow lake (Wingra, Wisc., U.S.A.). 2 : cylinders (diam. = 80 mm; ht. = 170 mm). 3 : in threes at two stations, each 0.5 m above bottom in about 3.5 m depth. 4 : tripton (dry wt.; organic sediment). 5 : 1-7 days. 6 : 1973. 7 : the data appear to be as in Gasith (1975), although they are more exhaustively related to the origin and transport of tripton in lakes.

Gasith, A. & Hasler, A.D. (1975). Airborne litterfall as a source of organic matter in lakes. *Limnol. Oceanogr. 21*, 253-258.
1 : shallow lake (Wingra, Wisc., U.S.A. : a = 1.4 km^2; $\bar{z}$ = 2.4 m). 2 : wire-mesh open boxes (1.10 x 0.91 m; depth 152 mm; pore size 0.4 cm^2). 3 : in pairs on bottom, at nine stations, 0-1.5 m offshore and further pairs 5, 10 and 20 m offshore (1972). In threes, at stations 1, 2, 3, 4 and 5 m offshore (1973). 4 : litterfall composition; dry weight; organic content. 5 : < 1 week. 6 : 1972, 1973. 7 : results compared with traps placed in air above surface; the observations were designed to measure the annual litterfall direct on to a lake.

Gessner, F. (1955). *Hydrobotanik. BdI. Energiehausalt.* Veb. Deutscher Verlag der Wissenschaften : Berlin.
SHORT REVIEW with four references (pp. 403-04).

Gliwicz, Z.M. & Hillbricht-Ilkowska, A. (1975). Ecosystem of the Mikołajskie Lake. Elimination of phytoplankton biomass and its subsequent fate in the lake through the year. *Polskie Archwm Hydrobiol. 22,* 39-52.
1 : lake (Mikołajskie, Poland). 2 : wide-mouthed jars (as Ławacz, 1969, q.v.). 3 : suspended at 10 m depth. 4 : particulate organic matter. Bomb calorimetry. 5 : 2-4 weeks. 6 : 1966, 1967 and 1969.

Glynn, P.W. (1977). Coral growth in upwelling and non-upwelling areas off the Pacific coast of Panama. *J. mar. Res. 35*, 567-585.
1 : continental shelf (Saboga I., Gulf of Panama and Secas I., Gulf of Chiriqui, Pacific coast of Panama). 2 : body > mouth (diam. = 14-20 mm; ht. = 140 mm). Set vertically in concrete blocks. 3 : mouth 150-250 mm above bottom. 4 : dry weight; organic and inorganic fraction. 5 : - 6 : 1972-1973. 7 : data used in computation of gross annual coral reef production.

Glynn, P.W. & Stewart, R.H. (1973). Distribution of coral reefs in Pearl Islands (Gulf of Panama) in relation to thermal conditions. *Limnol. Oceanogr. 18*, 367-379.
1 : continental shelf (Archipelago de las Perlas, Gulf of Panama).

2 : body > mouth (diam. = 14-20 mm; ht. = 140 mm). 3 : 3-6 replicates placed in concrete blocks, flush with bottom, or wired to rods held "at various elevations above the bottom". 4 : total dry weight; organic and inorganic fractions. 5 : c. 30 days. 6 : 1971-1972.

Götzinger, G. (1911). Die Sedimentierung der Lunzer Seen. *Verh. K.K. geol. Reichsanst., Wien*, 1911, 173-208.
1 : small lakes (Lunzer, Mittersee, Untersee, Austria). 2 : basin (a = 0.25 km^2). 3 : on sediment surface at several stations (16-33 m). 4 : volume; grain size. 5 : 92-109 days. 6 : 1 year. Sept. 1909 - Aug. 1910.

*Grim, J. (1950). Versuche zur Ermittlung der Produktionskoeffizienten einiger Planktophyten in einem flachen See. *Biol. Zbl. 69*, 147-174.
1 : lake (Schleinsee, Germany). 2 : body ≫ mouth (volume 6.75 l; mouth diam. = 300 mm). 3 : singly at 1 m and 5 m above bottom, in 10 m depth. 4 : phytoplankton counts. 5 : 1-4 weeks. 6 : summer 1947. 7 : classic paper relating phytoplankton losses to production rate.

Grim, J. (1952). Vermehrungsleistungen planktischer Algenpopulation en in Gleichgewichtsperioden. *Arch. Hydrobiol. (Suppl.) 20*, 238-260.
1 : lake (Schleinsee, Germany). 2 : body ≫ mouth. 3 : singly at 1 m and 5 m above bottom in 10 m depth. 4 : phytoplankton (specific). 5 : 1-4 weeks. 6 : summer 1947. 7 : further elaboration of data in Grim (1950).

Håkanson, L. (1976). A bottom sediment trap for recent sedimentary deposits. *Limnol. Oceanogr. 21*, 170-174.
1 : lake (Ekoln, Sweden). 2 : basin (diam. = 443 mm; with rim 45 mm). 3 : > 10 m depth. 4 : general inorganic. 5 : 1-3 months. 6 : 1971-1972. 7 : detailed description of traps used by Axelsson & Håkanson (1975), Håkanson (1977).

Håkanson, L. (1977). *Sediments as indicators of contamination - Investigations in the four largest Swedish lakes*. Naturvardsverkets Limnologiska Undersökning. Report 92, 159pp.
1 : lake (Ekoln, Uppsala, Sweden; a = 18.6 km^2). 2 : basin (of Håkanson, 1975 q.v.). 3 : on lake bottom. 4 : seston (dry weight; organic content; mercury content). 5 : 13 weeks. 6 : 1971-1972. 7 : review/report paper, conclusion of Axelsson & Håkanson (1975) included.

*Hargrave, B.T. (1978). Seasonal changes in oxygen uptake by settled particulate matter and sediments in a marine bay. *J. Fish. Res. Bd Can. 35*, 1621-1628.
1 : bay (Bedford Basin, Nova Scotia, Canada; z_m = 70 m). 2 : cylinders (of Hargrave et al., 1976 q.v.). 3 : four traps at 20, 30, 40, 50, 60 m in 60 m of water. 4 : organic material; total and chemical oxygen uptake. 5 : 6-28 days. 6 : Feb. 1973 - Nov. 1974.

†Hargrave, B.T. & Burns, N.M. (1979). Assessment of sediment trap collection efficiency. *Limnol. Oceanogr. 24*, 1124-1136.
1 : bays (St Margaret's Bay and St George's Bay, Nova Scotia, Canada) and laboratory experimental tanks (4 x 10 m, 1.8 m deep). 2 : cylinders (various height : mouth ratio), baffles, funnels, Tauber-type cover, horizontal-facing trap. 3 : 16 traps, 3 m above 10 m^2 bottom area, or in tank. 4 : dry weight. 5 : 7-28 days. 6 : 1973, 1977. 7 : important paper relating experimental field and laboratory exposures of different designs to theoretical predictions of the effects of turbulence on their trapping performance.

Hargrave, B.T. & McIntyre, A.D. (1976). Metabolism at the benthic boundary. In : *The benthic boundary layer* (ed. I.N. McCave), Plenum Press, New York. pp. 297-310.
REVIEW article, listing methodologies including traps.

Hargrave, B.T., Phillips, G.A. & Taguchi, S. (1976). Sedimentation measurement in Bedford Basin, 1973-1974. *Technical Report Fish. Mar. Serv. Can. 608*, 147 pp.
1 : bay (Bedford Basin, Nova Scotia, Canada). 2 : cylinders (diam. = 75 mm; ht. = 310 mm; based on Van Dorn sampler). 3 : four traps at 20, 30, 40, 50 and 60 m in 60 m of water, mounted in steel holders. 4 : total wt.; organic matter; organic carbon and nitrogen; chlorophyll; phaeophytin; microscopic examination. 5 : 6-28 days. 6 : 2 yrs (Feb. 1973 - Nov. 1974). 7 : temperature, salinity and dissolved oxygen measured at 10 depths during study period.

Hargrave, B.T. & Prouse, N.J. (1978). Assessment of sediment trap collection efficiency. *Abstr. 41st A. Mtg Am. Soc. Limnol. Oceanogr.*
ABSTRACT ONLY - Comments on calibration of cylindrical traps (of White & Wetzel, 1973) in experimental tank, which were "most accurate".

*Hargrave, B.T. & Taguchi, S. (1978). Origin of deposited material sedimented in a marine bay. *J. Fish. Res. Bd Can. 35*, 1604-1613.
1 : bay (Bedford Basin, Nova Scotia, Canada). 2 : cylinders (of Hargrave et al., 1976 q.v.). 3 : four traps at 20, 30, 40 and 60 m. 4 : carbon; nitrogen; chlorophyll *a*; phaeophytin. 5 : c. 28 days. 6 : Oct. 1973 : Nov. 1974.

Hartwig, E.O. (1976). Nutrient cycling between the water column and a marine sediment. I. Organic carbon. *Mar. Biol. 34*, 285-295.
1 : continental shelf (La Jolla Bight, California, U.S.A.). 2 : wide-mouthed jar (vol. 455 ml), with baffle. 3 : 1.75 m above bottom, in 18.3 m of water. 4 : dry wt.; organic matter; % organic carbon. 5 : 5 > 21 days. 6 : 1972-1973. 7 : mercuric chloride added to traps as preservative.

Hayashi, H., Okino, T. & Aoyama, K.A. (1972). The balance of organic matter in a water column in a lake. I. Examinations into the propriety of the concept of water column, using an artificial water column separated by a vinyl sheet. *Jap. J. Limnol. 33*, 51-59.
1 : shallow lake (Suwa-ko Japan; a = 14.5 km^2, z_m = 7.0 m). Also in artificial enclosure. 2 : funnels. 3 : at 4.5 m, in 5.3 m of water. 4 : phytoplankton; organic matter; ash; chlorophyll content. 5 : - 6 : 1968-1969.

Heim, A. (1900). Der Schlammabsatz am Grunde des Vierwaldstättersee. *Vjschr. naturf. Ges. Zürich, 45*, 164-182.
1 : lake (Vierwaldstättersee, Switzerland). 2 : basin : m^2 iron plate with 100 mm side. 3 : two traps used on flat bottom (a) off rocky shore at depth of 200 m (Urnersee) and (b) in shallow water of delta mudflat (Muottabecken). 4 : fresh and dry weights; organic content and chemical constituents : Si, Al, Fe, Ca, Mg, Cu, S, N, P. Qualitative description of biota. 5 : one year. 6 : April 1897 - April 1898. 7 : the earliest documented use of a sediment-trapping device. Trap first built in 1873.

Hendrikson, P. (1975). *Auf und Abbauprozene partikulärer organischer Substanz anhand von Seston-und Sinkstoffanalysen.* Ph.D. Thesis, Univ. of Kiel, 160pp.
NOT SEEN.

Hinga, K.R., Sieburth, J. McN. & Heath, G.R. (1979). The supply and use of organic material at the deep-sea floor. *J. mar. Res. 37*, 557-579.
1 : ocean (3515 m, 1345 m and 675 m deep). 2 : cylinder (diam. = 200 mm; ht. = 450 mm). Closed by timed burn wire. 3 : 50 and 100 m above bottom. 4 : dry wt.; carbonate; C, N, particle types. 5 : 1-4 days. 6 : June 1977. 7 : simultaneous measurements of benthic oxygen consumption were made below traps.

Hogetsu, K., Kitazawa, Y., Kurasawa, H., Shiraishi, Y. & Ichimura, S. (1952). Fundamental studies on the biological production and metabolism of inland waters, mainly of Lake Suwa. (Japanese). *Suisan Shigen-Kenkyu, 1*, 41-127.
NOT SEEN.

Höhne, E. & Odrich, E. (1966). Sedimentationstraten. *Limnologica, 4*, 313-320.
1 : reservoirs (Saidenbach, Naunzehnhain, Carlsfeld, East Germany). 2 : body ≫ mouth. 3 : 5-35 m below water surface. 4 : dry weight; organic and inorganic fractions. 5 : c. 1 week. 6 : August 1964-1965. 7 : compares waters of differing trophic status.

Honjo, S. (1976). Coccoliths : Production, transportation and sedimentation. *Mar. Micropal. 1*, 65-79.
1 : ocean (Tongue of the Ocean, Bahamas, 77°40'W, 24°50'N, North Atlantic).
REVIEW paper on the formation of oceanic coccolith oozes which employs unpublished data obtained by Wiebe et al. (1976, q.v.).

Honjo, S. (1978a). Sedimentation of materials in the Sargasso Sea at a 5,367 m deep station. *J. mar. Res. 36*, 469-492.
1 : ocean (Sargasso Sea, 31°32'N, 55°01'W, z_m = 5581 m). 2 : funnel pair (with honeycomb baffling; diam. = 1.38 m). 3 : 5,367 m below water surface. 4 : dry wt.; faecal pellets; carbon and nitrogen; S.E.M.; T.E.M.; mineral particles. 5 : 75 days. 6 : Oct. 1976 - Jan. 1977. 7 : bactericides applied to one of a pair of traps. Separate, floating traps also used, but no data reported.

Honjo, S. (1978b). Sedimentation of materials in the Sargasso Sea. *Trans. Am. geophys. Un. 59*, p.299.
ABSTRACT ONLY. See Honjo (1978a).

Honjo, S. (1980). Material fluxes and modes of sedimentation in the mesopelagic and bathypelagic zones. *J. mar. Res. 38*, 53-97.
1 : ocean (Sargasso Sea, Atlantic and Pacific). 2 : funnel (diam. = 1.5 m^2) honeycomb baffle. 3 : between 372 m and 5582 m in water up to 5792 m deep. 4 : dry wt.; C, N, carbonates; silicates; organic compounds; Foraminiferal tests; radiolarian skeletons; pteropod shells; diatom frustules; faecal pellets; size fraction. 5 : 61-110 days. 6 : 1976-1978.

Honjo, S., Manganini, S.J., Connell, J.F. & Goreau, M. (1979). Deep sea material flux. *Trans. Am. geophys. Un. 60*, (18), 296.
ABSTRACT ONLY. Oceanic deployment of arrays of sediment traps (of Honjo, 1978a).

Honjo, S. & Roman, M.R. (1978). Marine copepod faecal pellets; production, preservation and sedimentation. *J. mar. Res. 36*, 45-57.
1 : ocean (see Wiebe et al. 1976). 2 : segmented basin of Wiebe et al. (1976). 3 : 2050 m in 2150 m of water. 4 : faecal pellets. 5 : 2 months. 6 : 2 months. 7 : compares faecal pellets produced from cultured copepods with faecal pellets collected by Wiebe et al. (1976).

Hopkins, J.S. (1950). Differential flotation and deposition of coniferous and deciduous tree pollen. *Ecology 31*, 633-641.
1 : laboratory (University of Minnesota, St. Paul, U.S.A.). 2 : wide-mouthed jar (beaker : diam. = 45.7 mm; ht. = 108 mm). 3 : tank bottom, in c. 760 and c. 440 mm of water. 4 : pollen counts and specific sinking rates. 5 : 10 mins - 120 hours. 6 : - 7 : pollen deposition under wind conditions and sinking in relation to bladder size.

Hoskin, C.M., Burrell, D.C. & Freitag, G.R. (1975). Suspended sediment dynamics in Queen Inlet, Glacier Bay, Alaska. *Trans. Am. geophys. Un. 56*, 1003.
1 : estuary (Glacier Bay, Alaska). 2 : cylinders (diam. = 93 mm; ht. = 67 mm, diam. = 47 mm; ht. = 305 mm). 3 : 1 m deep and 10 m above bottom in up to 180 m of water. 4 : dry weight. 5 : 1-10 days. 6 : September, 1974 and June, 1975. 7 : sediment dispersal study.

Hoskin, C.M., Burrell, D.C. & Freitag, G.R. (1978). Suspended sediment dynamics in Blue Fjord, western Prince William Sound, Alaska. *Estuar. Coast. mar. Sci. 7*, 1-16.
1 : coastal inlet (Blue Fjord and Glacier Bay National Monument, Alaska). 2 : cylinders. (Various diameters and heights). 3 : - 4 : dry wt. 5 : up to 9 days. 6 : 1975. 7 : layering seen in traps and related to tidal cycle.

Hough, J.L. (1939). Bottom sampling apparatus. In : *Recent marine sediments. A symposium* (ed. P.D. Trask). Am. Assoc. Petrol. Geol., Tulsa, 631-664.
Methodological review includes section on sediment traps : describes detail modification to the design of Raymond & Stetson (1931). 2 : basin : 'truncated pyramid' with square bottom (c. 500 m sq.) and square opening (300 mm sq.). Push-rod automatic opening and closing of mouth. 3 : - 4 : - 5 : no max. given. 6 : - 7 : modified from Raymond & Stetson (1931).

Inman, D.L. (1949). Sediment trap studies of suspended material near the surf zone. *Q. Prog. Rep. Scripps Instn Oceanogr., 2.* (Contract W-49-055-Eng-3). Reference from Bloesch & Burns (1980).
NOT SEEN.

Iturriaga, R. (1979). Bacterial activity related to sedimenting particulate matter. *Mar. Biol. 55*, 157-169.
1 : bay (Eckernforder Bucht, Baltic Coast, West Germany). 2 : funnels. 3 : in fours on ring frame, at 10 and 18 m below surface in 20 m depth. 4 : dry weight; organic content; carbon; chlorophyll; BOD; ETS and ATP assays. 5 : 4-6 days. 6 : April 1975-1976.

Izeki, K. (1976a). In situ measurement of the vertical flux of particles by a newly designed collector. *Kaiyo Nagaku Noto 3*, 18-25.
1 : ocean (45°N, 165°W), Bering Sea and Alaska Bay. 2 : (i) funnel

(a = 0.25 m^2; ht. = 1 m, no lid). (ii) and (iii) cylinder with funnel bottom (diam. = 300 mm; cylinder ht. = 350 mm; total ht. = 950 mm) lids hinged at trap top. Deployed in pairs with a vane. 3 : (i) floating mooring with traps at 200 and 900 m. (ii) floating, traps at 100 and 500 m; anchored mooring with traps at 1000, 2000, 3000 and 4000 m. z_m = 4550 m. 4 : dry wt.; faecal pellets; organic C. 5 : (i) 29 hrs; (ii) 50 hrs; (iii) 310 hrs. 6 : 1975. 7 : first use of floating traps in open ocean.

Izeki, K. (1976b). *Vertical transport mechanism of particulate organic matter in the open sea*. Ph.D. Dissertation, Hokkaido Univ. 138pp. NOT SEEN.

Iz"yurova, A.I. (1960). Vzveshennye veshchestva i donnye otlozheniya Klyaz'minskogo Vodokhranilishcha. *Trudy Vses. gidrobiol. Obshch. 10*, 25-35.
1 : reservoir (Klyaz'minsk, U.S.S.R.). 2 : round-bottomed cylinders, (diam. = 60-75 mm; ht. = 200 mm). 3 : traps at several depths 7-8 m. 4 : dry weight partitioning. 5 : 1-2 months ? 6 : 1947-1948.

Järnefelt, H. (1955). Über die Sedimentation des Sestons. *Verh. int. Verein. theor. angew. Limnol. 12*, 144-158.
1 : lakes (Lohjanjärvi, Hormajärvi, Porsaslampi, Finland); cover a wide trophic range. 2 : wide-mouthed jars. 3 : singly, in depths from 2 to 50 m according to depth of lake. 4 : phytoplankton; zooplankton (fresh volume/specific composition). 5 : 1-5 weeks. 6 : summer 1952. 7 : calculated loss rates (% day^{-1}).

Johnson, D. (1977). Seston and sedimentation in Farmoor Reservoir, Great Britain. In : *Interactions between sediments and fresh water* (ed. H.L. Golterman), Junk-PUDOC, Den Haag, pp. 179-182.
1 : small reservoir (Farmoor, Oxon, U.K.). 2 : wide-mouthed jar (inverted 'bell jar', diam. = 150 mm; ht. = 400 mm). 3 : reservoir centre, 1 m above bottom. 4 : dry weight; organic and ash fractions; chlorophyll content; Ca content and algal counts. 5 : weekly. 6 : 1972. 7 : Johnson calculated that the device 'overtrapped', partly due to resuspension. Silica residue and organic content of trapped material correlated with algal fraction, esp. *Stephanodiscus astraea* counts.

†Johnson, M.G. & Brinkhurst, R.O. (1971). Benthic community metabolism in Bay of Quinte and Lake Ontario. *J. Fish. Res. Bd Can. 28*(11), 1715-1725.
1 : lake (Ontario, and Bay of Quinte, Canada). 2 : funnels (diam. = 50, 120 and 200 mm) and cylinders (diam. = 170 mm). 3 : 1.5 m above the bottom at four stations. 4 : organic matter. 5 : 1 week. 6 : 1967-1968. 7 : trap contents preserved with 10% v/v formalin. Performance characteristics of individual traps compared.

Jones, J.G. (1976). The microbiology and decomposition of seston in open water and experimental enclosures in a productive lake. *J. Ecol. 64*, 241-278.
1 : small, shallow lake. (Blelham Tarn, Cumbria, U.K.), and limnetic enclosures (Lund Tubes). 2 : body > mouth (diam. = 80 mm; ht. = 86 mm; aperture diam. = 64 mm). 3 : 1 m above the mud and 1 m below the thermocline in about 11 m of water. 4 : particulate material; dry weight; chlorophyll; C, N, P; sedimentation rate; bacterial counts. 5 : 1 week. 6 : 1972. 7 : particulate matter respiration was measured.

Jones, J.G. & Simon, B.M. (1980). Decomposition processes in the profundal region of Blelham Tarn and the Lund Tubes. *J. Ecol. 68* (in press).
1 : small, shallow lake (Blelham Tarn, Cumbria, U.K.), and limnetic enclosures (Lund Tubes). 2 : body > mouth; identical with those used by Jones (1976). 3 : 1 m above the mud, and 1 m below thermocline in about 11 m of water; of each pair, one inverted, "as a control". 4 : dry weight; chlorophyll; C, N, P. 5 : 1 week. 6 : 1977.

Kajak, Z., Hillbricht-Ilkowska, A. & Pieczynska, E. (1972). The production processes in several Polish lakes. In : *Productivity problems of freshwaters* (ed. Z. Kajak & A. Hillbricht-Ilkowska) PWN, Warszawa, pp. 129-147.
1 : lake (Mikołajskie, Poland). 2 : wide-mouthed jars, of Ławacz (1969). 3 : at 10, 16 and 24 m near deepest water. 4 : 'tripton' (Seston?) : dry weight; calorific value. 5 : monthly. 6 : -

Kajak, Z. & Ławacz, W. (1977). Comparison of tripton sedimentation in four small lakes. In : *Interactions between sediments and fresh water* (ed. H.L. Golterman), Junk-PUDOC, Den Haag, pp. 72-75.
1 : 4 small lakes (Smolak, a = 6.4 ha; z_m = 5.8 m : Piecek, a = 8.3 ha; z_m = 23.1 m: Dgal Maly, a = 15.8 ha; z_m = 14.3: Czarna Kuta, a = 24.7 ha; z_m = 3.3 m; all Poland). 2 : wide-mouthed jar (diam. = 114 mm; ht. = 300 mm; aperture = 102 cm^2). 3 : in centre of each lake, 1 m above bottom; also at 5 m in Dgal Maly. 4 : "tripton" (seston?) : dry weight; C, N content. 5 : 2 weeks. 6 : Feb-Nov. 1971. 7 : cf. Weglenska et al. (1975).

Kajak, Z., Ławacz, W., Wisniewski, R.J., Rybak, J.I. & Dusoge, K. (1975). Ecosystem of the Mikołajskie Lake. The fate of organic matter of the profundal zone. *Polskie Archwm Hydrobiol. 22*, 89-99.
1 : lake (Mikołajskie L., Poland). 2 : wide-mouthed jars (of Ławacz, 1969). 3 : 2 stations, at 16 m and 24 m in centre of lake. 4 : "tripton" (seston?); dry weight: organic matter; calorific value. 5 : 2 weeks. 6 : 2 years (1966-1967). 7 : reworking of results of Ławacz (1969); comparison with new layer formation, begun in 1966.

Kamp-Nielsen, L. (1975a). A kinetic approach to the aerobic sediment-water exchange of phosphorus in Lake Esrom. *Ecol. Modelling 1*, 153-160.
1 : lake (Esrum Sø, Denmark; a = 17.3 km^2; $\bar{z}$ = 12.3 m). 2 : cylinder with funnel bottom : for description see Lastein (1976). 3 : 1 m above the lake bottom in 20 m depth of water. 4 : organic; total P, N. 5 : 2 weeks. 6 : June 1973 - June 1974.

Kamp-Nielsen, L. (1975b). Seasonal variation in sediment-water exchange of nutrient ions in Lake Esrom. *Verh. int. Verein. theor. angew. Limnol. 19*, 1057-1065.
1 : lake (Esrum Sø, Denmark). 2 : cylinder with funnel bottom. 3 : as described in Kamp-Nielsen (1975a) above. 4 : dry weight. 5 : 2 weeks. 6 : June 1973 - June 1974. 7 : data from previously published study (Kamp-Nielsen, 1975a).

Kamp-Nielsen, L. (1977a). Modelling the temporal variation in sedimentary phosphorus fractions. In : *Interactions between sediments and fresh water*, (ed. H.L. Golterman) Junk-PUDOC, Den Haag, pp. 277-285.
1 : lake (Esrum Sø, Denmark). 2 : cylinder with funnel bottom. 3 : 1 m above bottom at 20 m depth. 4 : sedimentary phosphorus. 5 : 2 weeks. 6 : 1975.

Kamp-Nielsen, L. (1977b). Horizontal and temporal variation in sedimentation-sediment composition in Lake Esrom. *5 Nordisk Sedimentsymposium, Salten Skov, Denmark*, pp. 8.
1 : lake (Esrum Sø, Denmark). 2 : cylinder, with funnel bottom? 3 : six different depths. 4 : seston (dry matter; loss on ignition; total phosphorus and nitrogen). 5 : 2 weeks. 6 : April 1976 - Jan. 1977.

Kimmel, B.L., Axler, R.P. & Goldman, C.R. (1977). A closing, replicate-sample, sediment trap. *Limnol. Oceanogr. 22*, 768-772.
1 : small lake (Castle L., Calif., U.S.A. : a = 19 ha; z_m = 37 m). 2 : cylinder with remote closure, vertical series. 3 : 10, 20, and 30 m in 35 m of water. 4 : seston; dry weight. 5 : c. 22 days. 6 : > 1 year. 1975. 7 : correction for attached growth. Demonstration of horizontal heterogeneity in lake.

Kimmel, B.L. & Goldman, C.R. (1977). Production, sedimentation and accumulation of particulate carbon and nitrogen in a sheltered sub-alpine lake. In : *Interactions between sediments and fresh water*, (ed. H.L. Golterman), Junk-PUDOC, Den Haag, pp. 148-155.
1 : small lake (Castle L., Calif., U.S.A.). 2 : cylinders (of Kimmel et al., 1977). 3 : at 10, 20 and 30 m in > 30 m of water. 4 : dry wt.; C, N. 5 : 20 days - 3 months. 6 : -

†*Kirchner, W.B. (1975). An evaluation of sediment trap methodology. *Limnol. Oceanogr. 20*, 657-660.
1 : small lake (Crawford L., Ont., Canada; a = 2.5 ha; meromictic). 2 : cylinders (ht. = 250 mm; various diams. : 32, 93, 195, 298 and 432 mm). 3 : traps set 1 m above and below the chemocline. 4 : dry weight; ash weight; phosphorus. 5 : 1-10 days. 6 : July-Oct. 1974. 7 : trap set with NaCl solution, and a dye. Important comparison of trap performances.

*Kleerekoper, H. (1952). A new apparatus for the study of sedimentation in lakes. *Can. J. Zool. 30*, 185-190.
2 : basin (1 m square tray; ht. = 50 mm, with hydraulically closing lid. 7 : description of the apparatus.

Kleerekoper, H. (1953). The mineralization of plankton. *J. Fish. Res. Bd Can. 10*, 283-291.
1 : lake (Lauzon L., Quebec, Canada). 2 : basin (of Kleerekoper, 1952). 3 : at 11 m (below thermocline) in 27 m of water. 4 : dry wt.; chemical composition: N, P, SiO_2, Ca, Mg, Fe; lignin; loss of ignition; plankton standing crop. 5 : 1 week and > 1 month. 6 : 1950-1951.

Knauer, G.A. & Martin, J.H. (1979). Ca, Cd, Cu, Mn, Pb and Zn fluxes (0-1500 m) in near shore Pacific waters. *Abstr. 42nd A. Mtg Am. Soc. Limnol. Oceanogr.*
ABSTRACT ONLY. 1 : continental shelf. 2 : cylinders, baffled (diam. = 73.9 mm, aspect ratio = 8.4). 3 : 35, 65, 150, 500, 750, 1500 m on floating array. 4 : Ca, Cd, Cu, Mn, Pb and Zn. 5 : 7-21 days

†Knauer, G.A., Martin, J.H. & Bruland, K.W. (1979). Fluxes of particulate carbon, nitrogen and phosphorus in the upper water column of the north-east Pacific. *Deep-Sea Res. 26*, 97-108.
1 : continental shelf (Monterey Bay, California) and ocean (33°N 144°W, N.E. Pacific). 2 : cylinders, baffled (diam. = 73.9 mm. Aspect ratio = 8.4). 3 : eight traps on frame at selected depths. 4 : carbon, nitrogen, phosphorus; faecal pellets. 5 : 7-21 days.

6 : - 7 : buffered formalin added (5% concentration). Max. trap depth = 1050 m. Pb-210 in traps compared with annual Pb-210 flux from atmosphere.

Koidsumi, K. & Sakurai, Y. (1968). Precipitating substances of Lake Suwa (materials for the limnology of Lake Suwa, IV). *Jap. J. Ecol. 18*, 212-217.
1 : shallow lake (Suwa-ko, Japan : a 14.5 km^2; z_m = 7.0 m). 2 : funnel (diam. = 300 mm). 3 : 0.5 m above bottom. 4 : % composition of seston; phytoplankton and zooplankton. 5 : 24 hours. 6 : Aug.-Dec. 1966.

Kupferman, S.L. & Livingston, H.D. (1979). A procedure for independently estimating blanks and uncertainties for measured values of ^{90}Sr and ^{137}Cs concentrations in the Atlantic Ocean. *J. mar. Res. 37*, 141-156.
1 : ocean (north Atlantic : 38°19N, 39°37W). 2 : cylinders (of Gardner, 1977) : a = 494 cm^2. 3 : 118 m and 518 m above bottom in 3577 m water. 4 : ^{137}Cs; dry wt., (material from Gardner, 1977). 5 : 15.8 days. 6 : May 1976.

Landing, W.M. (1978). *The chemistry and vertical flux of particulate materials in the northeast Gulf of Alaska*. M.S. Thesis, Univ. of Washington, Seattle, 102pp.
1 : continental shelf (off Icy Bay, Gulf of Alaska). 2 : cylinder (diam. = 152 mm; ht. = 475 mm) with grid baffle at the top. Traps closed with timer prior to retrieval. 3 : 7-55 m above bottom in 105 m of water. 4 : dry wt.; C, N, Si, Al, Fe, Mn, Cr, Cu, Ni, Pb, Zn. 5 : 14 days. 6 : March-June 1977. 7 : traps poisoned in situ with sodium azide.

Landing, W.M. & Feely, R.A. (1978). Major and trace element distributions among suspended particulate matter, vertically settling particles and underlying sediments from the northeast Gulf of Alaska. *Am. Soc. Limnol. Oceanogr. (Abstr.) 41*.
ABSTRACT ONLY. 1 : continental shelf (off Icy Bay, Gulf of Alaska). 2 : cylinder (see Landing, 1978). 3 : two stations, 7-55 m above bottom in 105 m of water. 4 : Si, Al, Cr, Mn, Fe, Ni, Cu, Zn, Pb; total C, N; organic matter. 5 : 14 days. 6 : March - June, 1977.

Lastein, E. (1976). Recent sedimentation and resuspension of organic matter in eutrophic Lake Esrom, Denmark. *Oikos 27*, 44-49.
1 : lake (Esrum Sø, Denmark). 2 : cylinder with funnel bottom (a = 220 cm^2). 3 : various depths. Always a trap 1.5 m above bottom in 20 m of water. 4 : dry wt.; proteins; carbohydrates; animal counts and organic matter. 5 : 2 weeks. 6 : Aug. 1971 - Aug. 1972. 7 : iodine added to one of the two traps placed at the same depth, and later adopted as standard technique.

†*Lau, Y.L. (1979). Laboratory study of cylindrical sedimentation traps. *J. Fish. Res. Bd Can. 36*, 1288-1291.
1 : laboratory (National Water Institute, Burlington, Ont., Canada). 2 : cylinder (diameters of 34, 50 and 80 mm and height between 212 and 500 mm). 3 : traps placed in 0.7 m of water. 7 : observation on removal of neutrally buoyant oil droplets from trap, which differs from resuspension of settled particles.

*Ławacz, W. (1969). The characteristics of sinking materials and the formation of bottom deposits in a eutrophic lake. *Mitt. int. Verein. theor. angew. Limnol. 17*, 319-331.

1 : lake (Mikołajskie, Poland; a = 4.6 km^2; z_m = 28 m). 2 : wide-mouthed jar; aperture area = 38.5 cm^2. 3 : six jars in wire baskets at two depths (10 m below surface and 1 m above bottom) at two separate stations (z_m = 17, 25 m). A further 8 traps were operated at 10 m depth at a third station for part of the study period. 4 : "tripton" (but apparently seston!) dry weight; organic fraction; calorific value. 5 : 15-30 days. 6 : Jan. - Dec. 1966. 7 : formalin and chloroform used as preserving agents.

Ławacz, W. (1970). Estimation of the energetic value of non-living particulate organic matter (tripton) by two different methods. *Polskie Archwm Hydrobiol. 17*, 135-139.
1 : lake (Mikołajskie, Poland). 2 : wide-mouthed jars (of Ławacz, 1969). 3 : 10 m below water surface, and 1 m above the bottom. 4 : "tripton" (= seston?) (dry wt.; organic matter; fats; protein; carbohydrates). 5 : 2 weeks. 6 : 1 year. (1966?) 7 : comparison of energy values obtained by using a bomb calorimeter and qualitative composition of organic matter.

Lund, J.W.G. & Talling, J.F. (1957). Botanical limnological methods with special reference to the algae. *Bot. Rev. 23*, 489-583.
Describes the use of sediment traps for measurements of sinking rates and also for the rate of multiplication of diatoms (see page 543).

Mason, D.L., Folger, D.W., Haupt, R.S., McGirr, R.R. & Hoyt, W.H. (1977). Pollutant distribution from a new paper plant in southern Lake Champlain. *Envir. Geol. 1*, 341-347.
1 : lake (Champlain, Vermont/N.Y., U.S.A.). 2 : cylinders (diam. = 80 mm; ht. = 130 mm). 3 : 0.2 to 0.9 m above bottom in about 6 m of water at 15 locations. 4 : total wt.; phosphorus; organic carbon; chlorite; kaolinite; anatase (TiO_2). 5 : 6 months. 6 : 6 months Nov. 1975 - May 1976. 7 : pollution study.

Matsuda, D., Koyama, H., Matsushima, H. & Ogami, T. (1977). Sedimentation rate and behaviour of particulate phosphorus in a eutrophic coastal environment. *J. Fac. Fish. Anim. Husb. Hiroshima Univ. 16*, 45-58.
1 : continental shelf (Setonaikai, Honshu/Shikoku, Japan). 2 : cylinder with funnel base (diam. = 177 mm). 3 : paired traps at 1 m/2 m above sea floor in water 7 m and 24 m deep. 4 : total phosphorus content; chlorophyll a content and dry wt. 5 : 1-2 days. 6 : 1975-1977.

Matsuyama, M. (1973). Organic substances in sediment and settling matter during spring in a meromictic lake, Suigetsu. *J. Oceanogr. Soc. Jap. 29*, 53-60.
1 : lake (Suigetsu-Ko, Japan : z_m = 34 m). 2 : funnel. 3 : paired at 9 depths from 2-20 m below water surface in 22 m of water. 4 : organic matter; proteins; carbohydrates; C; N. 5 : 3 months. 6 : March-June, 1967. 7 : phenol in one of every pair of test tubes, to inhibit biochemical degradation.

Mesecar, R. & Carey, A.G. (1975). In situ practice collector. *Proc. mar. Tech. Soc. and IEEE Ocean*, 441-443.
1 : ocean (Cascadia Abyssal Plain, "West of Oregon" N.E. Pacific). 2 : segmented basin : open-bottomed cylinders on a tray with a collecting surface of 4.5 m^2. 4 : organic detritus. 5 : up to 3 months. 6 : - 7 : collecting surfaces sequentially roll up for storage. Electronically timed anchor releases. Three sequential samples can be collected.

Miller, M.C. (1972). *The carbon cycle in the epilimnion of two Michigan lakes.* Ph.D. Thesis, Mich. State Univ.
NOT SEEN.

Moore, H.B. (1931). The muds of the Clyde Sea Area, III. Chemical and physical conditions. Rate and nature of sedimentation and fauna. *J. mar. biol. Ass. U.K. 17*, 325-358.
1 : estuary (Loch Striven head, Fairlie Sands, and Kilchattan Bay, Firth of Clyde, U.K.). 2 : wide-mouthed (diam. = 90 mm; ht. = 320 mm) and (diam. = 55 mm; ht. = 170 mm). 3 : traps at 18 m - 68 m in water up to 73 m deep. 4 : dry wt.; organic material. 5 : 1-2 weeks. 6 : 1930. 7 : traps move vertically with the tide.

Mothes, G. (1977). Sedimentationsrorgänge im Stechlinseegebiet. *Acta hydrochim. hydrobiol. 5*, 269-281.
Reference from Bloesch & Burns : NOT SEEN.

Mueller, W.P. (1964). The distribution of cladoceran remains in superficial sediments from three northern Indiana lakes. *Invest. Indiana Lakes Streams 6*, 1-63.
1 : shallow lake (Winona L., Ind., U.S.A.; a = 2.04 km^2; $\bar{z}$ = 9.1 m). 2 : wide-mouthed jars (diam. = 70 mm; ht. = 70-90 mm) and cylinders with funnel bottom. 3 : traps at 1.8 - 14.1 m in water depths 14.9 - 16.1 m. 4 : dry wt.; chemical composition; $CaCO_3$; organic matter. 5 : 32-59 days. 6 : 1959-1961. 7 : trapped for cladoceran/chitinous exuviae.

Neame, P.A. (1977). Phosphorus flux across the sediment-water interface. In : *Interactions between sediments and fresh water.* (ed. H.L. Golterman), Junk-PUDOC, Den Haag, pp. 307-312.
1 : lake (Castle L., Calif. U.S.A.). 2 : cylinders (a = 15.5 cm^2). 3 : suspended just above sediment. 4 : dry wt.; organic matter; soluble reactive phosphate; particulate phosphate. 5 : - 6 : 1973 - 1974.

Neev, D. & Emery, K.O. (1967). The Dead Sea : depositional processes and environments of evaporites. *Bull. geol. Surv. Israel,* No. 41. 147pp.
1 : lake (Dead Sea, Israel/Jordan). 2 : basin (rectangular; 250 mm x 20 mm; ht. = 150 mm). 3 : 1 and 10 m above bottom in 5 and 68 m of water. 4 : major elements and minerals, visual description of sizing. 5 : > 1 month. 6 : 1963. 7 : material collected was mostly chemical precipitive (see pp. 84-92).

Nichols, J. & Rowe, G.T. (1977). Infaunal macrobenthos off Cap Blanc Spanish Sahara. *J. mar. Res. 35*, 525-536.
1 : continental shelf (near Cap Blanc, Spanish Sahara), also bay (Buzzards Bay, Mass., U.S.A.). 2 : cylinders (diam. = 95 mm; ht. = 140 mm). 3 : paired traps suspended at various depths, 1-4 m off the bottom. 4 : total particulate matter; organic C and N. 5 : 3.5 to 12 hrs. 6 : April - November 1974. 7 : divers placed and recovered traps.

Niklaus, M. (1967). Geomorphologische und limnologische Untersuchungen am Oeschinensee. *Beitr. Geol. Schweiz. Hydrol. Ser.* No. 14, 116pp.
1 : lake (Oeschinersee, Switzerland). 2 : wide-mouthed jar (diam. = 250 mm; ht. 270 mm). 3 : traps put in profundal zone, 3-5 m above sediment, at six stations. 4 : seston. 5 : 1-2 years. 6 : 1963-1964. 7 : a 'sediment strainer' is operated above the trap presumably to reduce turbulence above the trap.

Nordlie, F.G. & Anderson, J.F. (1972). A sediment trap for use in soft-bottomed lakes. *Q. Jl Fla Acad. Sci. 35*, 155-157.
1 : small lake (L. Mize, Florida; z_m = 25 m, a = 0.86 ha). 2 : cylinder (diam. = 77 mm, ht. = 610 mm). 3 : "well below euphotic zone". 4 : seston. 5 : 1 year. 6 : 1 year.

Nozaki, Y., Brewer, P.G. & Spencer, D.W. (1979). The radionuclide composition of sediment trap samples from the Equatorial Atlantic Ocean. *Trans. Am. geophys. Un. 60*(18), 283.
ABSTRACT ONLY. Further results from study reported by Brewer, Nozaki and Spencer (1979, q.v.).

Nuhfer, E.G. & Anderson, R.Y. (1978). Internal geochemical calibration of sediment traps to estimate true annual sediment flux rates in lakes. *W. Va Acad. Sci. Abstr. 50*, 39.
ABSTRACT ONLY.

Nuhfer, N.B. (1979). *Temporal and lateral variations in the geochemistry, mineralogy and microscopy of seston collected in automated samplers (from selected lakes in Ohio, Pennsylvania and New Mexico)*. Ph.D. Thesis, Univ. of New Mexico. 396 pp.
1 : lakes (Morgan L., New Mexico, a = 5.1 km^2; z_m = 30. Edinboro L., Penn., a = 0.9 km^2; z_m = 9 m : East Twin L., Ohio, a = 0.27 km^2; z_m = 12 m). 2 : cylinders with funnels at bottom emptying into thin column as in Anderson (1977 q.v.). 3 : 3.5 m above bottom in 6-28 m of water. 4 : X-ray diff., Si, Al, Fe, Ca, Na, K, Mg, Ti, Mn, Zn, Cu, Sr. 5 : 1-11 months. 6 : June-Sept. 1972 in Morgan L. Sept. 1976 - Oct. 1977 in Edinboro L. Oct. 1973 - May 1975 in East Twin L. 7 : sometimes poisoned accumulation tubes with phenol or formalin. Teflon beads mark pre-set time intervals in accumulation tubes.

Odrich, E. (1965). *Untersuchung über die Sedimentation in Trinkwassertalseperre unterschiedlichen Trophiegrades*. M.S. Thesis, Math. - Nat. Fak. Univ. of Leipzig.
NOT SEEN.

Ohle, W. (1962). Der Stoffhaushalt der Seen als Grundlage einer allgemeinen Stoffwechseldynamik der Gewässer. *Kieler Meeresforsch. 18*, 107-120.
1 : small lakes (Schönsee, z_m = 29 m; Schluensee, z_m = 46 m; Plusssee, z_m = 30 m, Holstein, German Federal Republic). 2 : cylinder with funnel-bottom (a = 100 cm^2). 3 : 3 depth stations in Schluensee and Pluss-see; 2 in Schöhsee. 4 : seston (weight; carbon content). 5 : 3-6 weeks. 6 : May-December 1960. 7 : C-flux and metabolism in the three lakes investigated.

Ohle, W. (1965). Primarproduktion des Phytoplanktons und Bioaktivitat holsteinischer Seen, Methoden und Ergebnisse. *Limnologiesymposion* 1964, 24-43.
Review of attempts to determine sedimentation rates in lakes. Illustrates trap design used in Ohle (1962), and presents additional data for Trammer See, Kleiner Plöner See and Ihlsee, West Germany.

Okino, T., Yamagishi, H., et al. (1969). Materials for ecological study of Lake Suwa. *Prelim. Rep. Inst. nat. Resour. 71*, 40-60.
NOT SEEN.

Okuda, T. (1960). Metabolic circulation of phosphorus and nitrogen in Matsushima Bay (Japan) with special reference to exchange of these elements between sea-water and sediments. *Trabhs Inst. Biol. mar. Oceanogr. Univ. Recife, 2*, 7-154.
1 : bays (Matsusima, Shiogama, Japan). 2 : cylinders (diam. = 30 mm). 3 : 200 mm above bottom to 1 m from surface in 1.5 - 5.0 m water. 4 : dry wt; total phosphorus and nitrogen; and organic carbon. 5 : 1-28 days. 6 : 1956-1958.

Olszewski, P. (1946). Zimowe stosunki tlenowe wiekszych jezior tatrazanskich. *Rozprawy Polskiej Akad. Nauk. Ser. III A 47*.
Reference from Bloesch & Burns (1980) : NOT SEEN.

Ott, B. (1975). Community patterns on a submerged barrier reef at Barbados, West Indies. *Int. Revue ges. Hydrobiol. Hydrogr. 60*, 719-736.
1 : barrier reef (off Barbados). 2 : cylinders (bacterial culture tubes (diam. = 10 mm; ht. = 160 mm)). 3 : in sand pockets on inside and outside of reef at water depths of 13.5 m - 45 m, 40-50 mm of tube above sand. 4 : seston, dry weight. 5 : 1-2 weeks. 6 : 1972-1973. 7 : divers position and collect traps.

Otto, G. & Benndorf, J. (1971). Über den Einfluss des physiologischen Zustandes sedimentierender Phytoplankter auf die Abbauvorgänge während der Sedimentation. *Limnologica 8*, 365-370.
1 : Experimental enclosures (reservoir, Saidenbach, E. Germany). 2 : body $\gg$ mouth (as Grim 1950 q.v.). 3 : two traps at 20 m depth. 4 : *Fragilaria crotonensis* (dry wt.; phosphate content). 5 : 8 days. 6 : 1967. 7 : data associated with diatom growth.

Oviatt, C.A. & Nixon, S.W. (1975). Sediment resuspension and deposition in Narragansett Bay. *Estuar. coast. mar. Sci. 3*, 201-217.
1 : bay (Narragansett Bay, R.I., U.S.A.; $\bar{z}$ = 9 m). 2 : funnels (diam. = 160 mm). 3 : traps 1 - 4 m off bottom in 7 m of water. 4 : wet volume; dry wt.; grain size; organic content; C and N content. 5 : 1-4 weeks. 6 : 1972-1973.

Parmenter, C.M., Bothner, M.H., Butman, B. & Milliman, J. (1979). Characteristics and causes of the bottom nepheloid layer on the continental shelf, southeastern New England. *Geol. Soc. Am. Abstr. 11*, 492.
ABSTRACT ONLY. Continental shelf (Martha's Vineyard, off Mass., U.S.A.) deployment of a cylindrical sediment trap of unspecified dimensions.

Parsons, T.R., Takahashi, M. & Hargrave, B.T. (1977). *Biological Oceanographic Processes*. (2nd Edn). Pergamon, Oxford, 332 pp.
REVIEWS the principles of transport of suspended solids and its measurement (pp. 229-235) and provides fourteen references to the use of sediment traps.

Parsons, T.R., Thomas, W.H., Seibert, D., Beers, J.R., Gillespie, P., & Bawden, C. (1977). The effect of nutrient enrichment on the plankton community in enclosed water columns. *Int. Revue ges. Hydrobiol. Hydrogr. 62*, 565-572.
As Parsons, von Bröckel, et al. (1977, q.v.).
4 : sedimented C calculated from above.

Parsons, T.R., von Bröckel, K., Koeller, P., Takahashi, M., Reeve, M.R. & Holm-Hansen, O. (1977). The distribution of organic carbon in a marine planktonic food web following nutrient enrichment. *J. exp. mar. Biol. Ecol. 26*, 235-247.

1 : CEE (62 m^3), (Saanich Inlet, B.C. Canada). 2 : wide-mouthed jar (diam. = 63 mm; ht. = 90 mm). 3 : four traps clamped together at 10 m depth. 4 : dry weight; calorific content. 5 : 7 days. 6 : August 1975 (?)

Patten, B.C., Young, D.K. & Roberts, M.H. (1966). Vertical distribution and sinking characteristics of seston in the Lower York River, Virginia. *Chesapeake Sci.* 7, 20-29.
1 : estuary (Lower York River, Va., U.S.A.; z_m at low water = 7.9 m). 2 : body > mouth (BOD bottles; diam. of aperture c. 30 mm). 3 : depth of traps varied with tidal cycle. 4 : seston (total wt.; ash wt.; seston conc.; organic and inorganic solids). 5 : 24 hours. 6 : 1961-1962. 7 : observations on hydrodynamic flow around traps.

Payne, R. & Davies, J.M. (1977). The Aberdeen sedimentation trap and its moorings. *Scott. Fish. Res. Rep. No. 8,* 11pp.
1 : inlets (Sullom Voe, Shetland and "various" Scottish sea lochs) and continental shelf (Fladen Ground, North Sea). 2 : funnel, with gridded baffle (10 x 10 x 40 mm deep). 3 : sets of traps from 2 m above the bottom to 100 m. 4 : faecal pellets; phytodetritus; crustacean remains; sand grains; diatoms. 5 : c. 7 days. 6 : 1976. 7 : demonstrates the importance of using a string of several traps on one line at various depths.

†*Peck, R.M. (1972). Efficiency tests on the Tauber trap used as a pollen sampler in turbulent water flow. *New Phytol. 71,* 187-198.
1 : laboratory (Botany School, Univ. of Cambridge). 2 : body > mouth (Tauber trap). 3 : varying water-flow speeds. 4 : pollen (diameter between 10-70 μm). 5 : - 6 : - 7 : important test of trap performance in flume.

Peck, R.M. (1973). Pollen budget studies in a small Yorkshire catchment. In : *Quaternary Plant Ecology* (eds H.J.B. Birks & R.G. West), Blackwell, Oxford, pp. 43-60.
1 : two small reservoirs and inflow streams (Oakdale Catchment, N. Yorkshire, U.K.). 2 : body > mouth (Tauber design). 3 : lake traps in series separated by 1 m intervals; air traps above. 4 : pollen. 5 : 1 month. 6 : 1968-1969.

Pennington, W. (1973). The recent sediments of Windermere. *Freshwat. Biol. 3,* 363-382.
1 : lake (Windermere, Cumbria, U.K.). 2 : cylinder (diam. = 80 mm; ht. = 300 mm : See Pennington 1974). 3 : traps suspended in pairs 5 m above the mud surface. 4 : wet volume; ash content; diatomaceous silica. 5 : 1 month. 6 : 1941-1942. 7 : sediment accumulation rate compared with three other methods of assessment.

†*Pennington, W. (1974). Seston and sediment formation in five Lake District lakes. *J. Ecol. 62,* 215-251.
1 : lakes (Windermere, Esthwaite Water, Blelham Tarn, Ennerdale Water, Wastwater; Cumbria, U.K.). 2 : cylinders (diam. = 80 mm; ht. = 300 mm) and body > mouth (Tauber trap see Tauber 1973). 3 : paired traps 2 m above mud and 2 m below water surface. 4 : seston wet volume; pollen C, N, I_2, K, Ca, sulphide. 5 : 1-3 months. 6 : 1-3 years. 7 : comparison of various traps in Blelham Tarn : experiments with funnels quantitatively described.

Peterson, B.J. (1979). Plankton sedimentation : the missing global carbon sink? *Abstr. 42nd A. Mtg Am. Soc. Limnol. Oceanogr.*
ABSTRACT ONLY. Used carbon flux data on Rowe and Gardner, (1979) and Honjo (1978a) to argue against plankton sedimentation as "the missing global carbon sink".

Peterson, C.G.J. & Boysen Jensen, P. (1911). Valuation of the sea. I. Animal life of the sea bottom, its food and quantity. *Rep. Dan. biol. Stn, 20*, 1-76.
1 : inlet (Thisted Bredning, Denmark). 2 : cylinder. 3 : at shallow, inshore station. 4 : sedimentation rate; carbon content. 5 : - April - August 1910.

Phleger, C.F. & Soutar, A. (1971). Free vehicles and deep-sea biology. *Am. Zool. 11*, 409-418.
1 : ocean floor. 2 : not specified. 3 : attached directly to mooring. 7 : describes using traps on moorings in the ocean with timed anchor release.

Prahl, F.G. & Carpenter, R. (1979). The role of zooplankton faecal pellets in the sedimentation of polycyclic aromatic hydrocarbons in Dabob Bay, Washington. *Geochim. cosmochim. Acta 43*, 1959-1972.
1 : bay (Puget Sound, Wash., U.S.A.). 2 : cylinders (diam. = 150 mm, ht. = 450 mm) closed by timed burn wire. Baffle on top. 3 : at 60 m in 110 m water depth. 4 : dry wt.; hydrocarbons; organic C; Al. 5 : 3-6 weeks. 6 : March 1977 - March 1978. 7 : measurements compared to material in plankton tows, core tops, and oxygen uptake.

Prouse, N.J. & Hargrave, B.T. (1977). Chlorophyll, carbon and nitrogen in suspended and sedimented particulate matter in St. Georges Bay, Nova Scotia. *Tech. Rep. Fish. mar. Serv. Can.* No. 721, 69pp.
1 : bay (St. Georges Bay, Nova Scotia, Canada). 2 : cylinder (diam. = 75 mm; ht. = 310 mm). 3 : 1-13 m above bottom. 4 : dry weight; C, N; chlorophyll; phaeophytin. 5 : 7 or 14 days. 6 : June - Sept. 1976.

Qasim, S.Z. & Sankaranarayanan, V.N. (1972). Organic detritus of a tropical estuary. *Mar. Biol. 15*, 193-199.
1 : estuary (Cochin Backwater, India). 2 : cylinder. Based on Trevallion's (1967) design. 3 : 0.5 m above bottom in water depth 2-3 m. 4 : dry weight; total P, C, N; chlorophyll. 5 : 2 weeks. 6 : 1 year (1969/1970).

Ravera, O. & Viola, M. (1977). Sedimentation rate in a basin (Agno) of Lake Lugano. In : *Interaction between sediments and fresh water* (ed. H.L. Golterman), Junk-PUDOC, Den Haag, pp. 174-178.
1 : lake (L. di Lugano, Switzerland/Italy: a = 49 km^2; z_m = 288 m; $\bar{z}$ = 134 m). 2 : cylinder. Upper and lower collecting chamber. 3 : between 5 m and 73 m in 75 m of water. 4 : dry weight; C, N; chlorophyll. 5 : from 6-29 days. 6 : 220 days. 7 : similar to Fuhs (1973) model.

Raymond, P.E. & Stetson, H.C. (1931). A new factor in the transportation and distribution of marine sediments. *Science, N.Y. 73*, 105-106.
1 : continental shelf. 2 : body > mouth. Closing device. 3 : traps on the sea floor, in 14-64 m of water. 4 : grain size. 5 : 1 week. 6 : - 7 : preliminary report; designed to catch sediment travelling close to the sea floor.

Reissinger, A. (1930). Untersuchungen über den Niedersonthofener See im bayerischen Allgau. *Wiss. Veröff. dt. ost. Alpenver., 6.*
Reference from Bloesch & Burns (1980). NOT SEEN.

Reissinger, A. (1932). Quantitative Unterschungen über den Schlammabsatz im Alpsee, dem Niedersonthofener See, und dem Starnberger See. *Arch. Hydrobiol. 24*, 535-542.
1 : lakes (Alpsee, Niedersonthofener See, Starnberger See, W. Germany). 2 : discs c. 700 mm diam; ± sides (60-80 mm). 3 : directly on sediment, at 7 locations in Starberger See, five in the others. 4 : dry weight; $CaCO_3$; $MgCO_3$; Fe_2O_3; clay. 5 : up to 8 years. 6 : 1924-1932. 7 : 'traps' have minimal protection for sedimented material during recovery.

Revelle, R. & Shepard, F.P. (1939). Sediments off the California Coast. *Bull. Am. Ass. Petrol. Geol., 22*, 245-282.
1 : continental shelf (off La Jolla, Calif., U.S.A.). 2 : segmented basin : box with shallow trays. 3 : placed on sea floor. 4 : grain size. 5 : 2 months. 6 : Jan. - March 1938. 7 : size distribution of trap samples compared with surface sediment. Near bottom sediment transport study.

Reynolds, C.S. (1975). Interrelations of photosynthetic behaviour and buoyancy regulation in a natural population of a blue-green algae. *Freshwat. Biol. 5*, 323-338.
1 : small, shallow lake (Crose Mere, Shropshire, U.K.; a = 15 ha; z_m = 9 m). 2 : funnel (inserted into cylinder). 3 : paired traps (one facing downwards) at 1.0 m, 1.5 m and 2.0 m below the water surface. 4 : algal counts. 5 : 2-5 days. 6 : March to July 1973. 7 : traps used to detect controlled buoyant movements of phytoplankton.

Reynolds, C.S. (1976a). Sinking movements of phytoplankton indicated by a simple trapping method. I. A *Fragilaria* population. *Br. phycol. J. 11*, 279-291.
1 : small, shallow lake (Crose Mere, Shropshire, U.K.). 2 : funnel (inserted into cylinder). 3 : six single traps placed between 0.5 m and 5.5 m in 9.2 m of water. 4 : algal counts. 5 : < 1 week. 6 : April to Sept. 1974.

Reynolds, C.S. (1976b). Sinking movements of phytoplankton indicated by a simple trapping method. II. Vertical activity ranges in a stratified lake. *Br. phycol. J. 11*, 293-303.
1, 2, 3, 4, 5 : As Reynolds 1976a. 7 : counts from a spread of single traps were used to define vertical activity range (i.e. scope of vertical migrations) of motile phytoplankton.

†Reynolds, C.S. (1979). Seston sedimentation : experiments with *Lycopodium* spores in a closed system. *Freshwat. Biol. 9*, 55-76.
1 : experimental limnetic enclosures (Lund Tubes : Blelham Tarn, Cumbria, U.K.). 2 : Tauber (1967 design) and jar traps of Jones (1976) body > mouth. 3 : paired traps between 1 m below water surface and 3 m above lake bottom. 4 : *Lycopodium* spore counts. 5 : 1-2 weeks. 6 : Jan. to Nov. 1976. 7 : calibration of traps under limnetic conditions against known particle flux.

Rhoads, D.C. & Young, D.K. (1970). The influence of deposit-feeding organisms on sediment stability and community trophic structure. *J. mar. Res. 28*, 150-178.
1 : bay (Buzzards Bay, Mass., U.S.A.). 2 : segmented basin. Mesh

screen and current baffles. 3 : on the sea floor - mouth 100 mm above the bottom in up to 20 m of water. 4 : sediment resuspension. 5 : 5-7 days. 6 : July-Sept. 1968. 7 : traps positioned and recovered by divers.

Richardson, M.J. & Gardner, W.D. (1979). Deep-sea resuspension as measured with sediment traps. *Geol. Soc. Am. Abstr. 11*, 503.
ABSTRACT ONLY. 1 : ocean (Atlantic, z_m = 4390 m and 5530 m). 2 : cylinders (diam. = 250 mm, ht. = 620 mm). 3 : 8 traps from 9 to 300 m above bottom on first mooring. 9 traps from 9 to 1541 m above bottom on second mooring. 4 : dry wt.; particle size. 5 : 76 days. 6 : June-Aug. 1978. 7 : increase in near-bottom traps shows resuspension. Current meters and nephelometers also attached to moorings.

Richardson, M.J., Shor, A.N., Gardner, W.D. & Sullivan, L. (1978). Evidence for resuspension of bottom sediments south of Iceland. *Trans. Am. geophys. Un. 59*, 299.
1 : ocean (Katla Ridge, S. of Iceland). 2 : cylinder (diam. = 250 mm, ht. = 620 mm). 3 : water depths - 1600, 2000, 2160 m. Traps spaced at 10, 50, 100 and 500 m above bottom. 4 : dry weight. 5 : up to 2 weeks. 6 : June-July 1977. 7 : evidence for resuspension.

Rigler, F.H., MacCallum, M.E. & Roff, J.C. (1974). Production of zooplankton in Char Lake. *J. Fish. Res. Bd Can. 31*, 637-646.
1 : small lake (Char Lake, Northwest Territories, Canada). 2 : cylinder (diam. = 197 mm, ht. = 305 mm). 3 : suspended from ice at 8, 16, 24 m depths in respectively 10, 20 and 27 m of water. 4 : zooplankton exuviae. 5 : 1-6 weeks. 6 : 4 years. 7 : 5% NaCl and Lugol's solution in the bottom 5 cm of the trap. Traps used to measure energy flux from the planktonic to benthic community. Trap efficiency tested.

Robertson, C.K. (1979). Quantitative comparison of the significance of methane in the carbon cycles of two small lakes. *Ergebn. Limnol. H. 12*, 123-135.
1 : lakes (Third Sister L., a = 0.04 km^2; z_m = 18 m: Frains L., a = 0.07 km^2; z_m = 9 m, Mich., U.S.A.). 2 : cylinders (diam. = 38 mm). 3 : 1 m above bottom. 4 : organic carbon. 5 : 1-3 weeks. 6 : May-Oct. 1976. 7 : compared 3-week and 3 1-week collections; collected gas bubbles with inverted funnel, and measured methane content of cores and water column.

Rossolimo, L. (1937). Material zur Kenntnis der Sedimentation der Seeablagerunge. [In Russian : German summary]. *Trudy Limnol. Stantsii v Kosine, 21*, 5-20.
1 : small, shallow lake (Beloe Ozera, Kossino, USSR). 2 : basin-(square?) box, 500 mm side, 60-100 mm vertical height. 3 : at 4 m depth above deepest point (13 m). 4 : dry weight; mineral; organic fraction weights; SiO_2, CaO, Fe_2O_3, SO_4 expressed as percentage of dry weight. 5 : monthly. 6 : data given for Jan.-Dec. 1928. 7 : compares data with other information then in literature.

Rother, J.A. & Fay, P. (1977). Sporulation and the development of planktonic blue-green algae in two Salopian meres. *Proc. R. Soc. B. 196*, 317-332.
1 : small lakes (Kettle Mere, White Mere; Shropshire, U.K.). 2 : cylinder containing 14-16 plastic tubes (diam. = 15 mm). 3 : 2 m above the bottom (below summer thermocline) in water > 6 m depth.

4 : dry weight; algae (quantitative and qualitative). 5 : -
6 : 1974-1975.

Rowe, G.T. & Gardner, W.D. (1979). Sedimentation rates in the slope water of the north-west Atlantic Ocean measured directly with sediment traps. *J. mar. Res. 37*, 581-600.
1 : ocean (Atlantic near N.E. United States. z_m : 2200 m - 3650 m). 2 : cylinder (diam. = 250 mm; ht. = 750 mm). 4 : size analysis; SEM; $CaCO_3$; organic C and N; seston. 5 : 5.8 - 15.8 days. 6 : summer 1976. 7 : no attempt to retard microbial activity - assumed slight. Time release to close lids.

Rubinoff, R.W. (ed.) (1974). *1973 Environmental monitoring and baseline Data*. Smithsonian Institution Environmental Science Program.
NOT SEEN. pp. 140-141 and 207-213 are of interest.

Saijo, Y. (1956). Chemical studies in lake metabolism. (In Japanese). *J. chem. Soc. Japan 77*, 917-936.
1 : lakes in Japan. 2 : wide-mouthed glass jars. 3 : 2-30 m below surface in lakes 3-30 m deep. 4 : C, N, SiO_2, Al_2O_3, Fe_2O_3, CaO, MgO, MnO, P_2O_5. 5 : 1-4 months. 6 : July-August, 1950. 7 : found inverse correlation between mean lake depth and total particle flux.

Saijo, Y., Tsujimoto, A., Ichimura, S., & Takada, K. (1954). Studies on lake deposits (2), seasonal variation of deposits in Nakanuma, Ibaragi Prefecture (Japanese). *Geogrl Rev. Japan 27*, 69-76.
NOT SEEN. (Reference in Toyoda et al., 1968).

Saunders, K.D. (1976). Near-bottom currents measured during the 1976 mid-lake dynamics experiment. *Rep. Argonne Natn. Lab.* Radiological and Environmental Division Annual Report ANL-75-60, Pt. III. (available from Argonne National Laboratory, 9700 South Cass Av. Argonne, Ill. 60439, U.S.A.).
1 : lake (L. Michigan, Mich., U.S.A.). 2 : cylinder (of Wahlgren and Nelson, 1976a). 3 : in water depths between 79 m and 161 m. 7 : current meters deployed at four of the stations simultaneously used for sediment trap placement by Wahlgren and Nelson, 1976b. Rate of trapping of seston related to average kinetic energy density.

Schick, G.B., Isaacs, J.D. & Sessions, M.H. (1968). Autonomous instrumentation in oceanographic research. *Mar. Sci. Instrum. 4*, 203-230.
1 : continental shelf (Santa Barbara Basin, Calif., U.S.A.). 2 : funnel. 3 : 6 m above sea bottom. 4 : Foraminifera. 5 : 4 days. 6 : August 1966. 7 : determination of production rate of planktonic Foraminifera.

Scott, W. & Miner, D.H. (1936). Sedimentation in Winona Lake and Tippecanoe Lake, Kosciusko County, Indiana, July 31, 1930 to July 30, 1935. *Proc. Indiana Acad. Sci. 45*, 275-286.
1 : shallow lakes (Winona L. and Tippecanoe L., Indiana, U.S.A.). 2 : wide-mouthed jars. 3 : traps set between 1 m and 35 m below the water surface. 4 : total dry weight; algae; $CaCO_3$; organic; sand; clay. 5 : 10 to 60 months. 6 : 5 years, 1930-1935.

Seki, H., Skelding, J. & Parsons, T.R. (1968). Observations on the decomposition of a marine sediment. *Limnol. Oceanogr. 13*, 440-447.
1 : bay (Departure Bay, B.C., Canada). 2 : wide-mouthed jars. 3 : see Stephens et al. (1967) q.v. 4 : C, N, P; nutritional value; antibiotic activity. 5 : c. 30 days. 6 : 1 year. 7 : bacterial action studied. See also Stephens et al. (1967).

Serruya, C. (1977). Rates of sedimentation and resuspension in Lake Kinneret. In : *Interactions between sediments and fresh water* (ed. H.L. Golterman), Junk-PUDOC, Den Haag, pp. 48-56.
1 : lake (Kinneret, Israel; a = 170 km^2; $\bar{z}$ = 25 m; z_m = 42 m). 2 : funnel; a = 314 cm^2. 3 : 1 m - 1.5 m above the lake bottom by SCUBA divers. 4 : seston (dry wt.; carbonates; organic matter; alumino silicate; organic C, N; total phosphorus). 5 : monthly. 6 : 1972-1973. 7 : reworking of data obtained by Serruya et al. (1974).

Serruya, C., Edelstein, M., Pollingher, U. & Serruya, S. (1974). Lake Kinneret sediments : nutrition composition of the pore water and mud water exchange. *Limnol. Oceanogr. 19*, 489-508.
1 : lake (Kinneret, Israel; a = 170 km^2; $\bar{z}$ = 25 m; z_m = 42 m). 2 : funnel (a = 314 cm^2). 3 : traps placed 1 - 1.5 m above the bottom at various water depths between 25 and 42 m. 4 : seston (weight; Mn; total Fe and P; organic C and N). 5 : 2 weeks. 6 : 20 months (1972-3).

Shepard, F.P. (1948). *Submarine Geology*, Harper, New York, 348 pp. (see p. 30-35).
1 : continental shelf (off La Jolla, Calif., U.S.A.). 2 : segmented basin. 3 : placed on sea floor. 4 : total sediment. 5 : ? 2 months. 6 : Jan. - Mar. 1938. 7 : only general reference to experiments of Revelle & Shepard (1939) with photograph of trap designed by K.O. Emery.

Sholkovitz, E. & Soutar, A. (1975). Changes in the composition of the bottom water of the Santa Barbara basin : effect of turbidity currents. *Deep-Sea Res. 22*, 13-21.
1 : continental shelf (Santa Barbara basin, off Calif., U.S.A.) 2 : unknown configuration. 3 : two traps attached in series at 3 m and 20 m above the bottom in 590 m of water. 4 : dry weight. 5 : 2 days. 6 : 17-20 Dec. 1969.

*Sleire, B. (1978). Metoder til måling av sedimentert materiale i vann. *Fauna (Oslo), 31*, 42-47.
REVIEW, with 9 references, describing trapping methods available for use in lakes.

Smetacek, V., Brockel, K. von, Zeitzschel, B. & Zenk, W. (1978). Sedimentation of particulate matter during a phytoplankton spring bloom in relation to the hydrographical regime. *Mar. Biol. 47*, 211-226.
1 : continental shelf (Bornholm Basin, Baltic Sea). 2 : funnel (of Zeitschel et al. 1978, q.v.). 3 : at 32 m to 60 m in 64 m of water, and at the second station, at 51 m and 65 m in 70 m of water. 4 : dry wt.; organic C, N; chlorophyll; phytoplankton C. 5 : 5-7 days. 6 : April/May 1975. 7 : chloroform added to the trap. Sampling efficiency discussed.

Smith, N.D. (1978). Sedimentation processes and patterns in a glacier-fed lake with low sediment input. *Can. J. Earth Sci. 15*, 741-756.
1 : lake (Hector L., Alberta, Canada; z_m = 87 m; a = km^2). 2 : wide-mouthed jar (area of aperture = 95 cm^2). 3 : 31 stations. 4 : wt.; grain size; deposition rate; detrital carbonate. 5 : 1-2 weeks. 6 : July to Sept. 1974.

Sonntag, N.C. & Parsons, T.R. (1979). Mixing an enclosed, 1300 m^3 water column : effects on the planktonic food web. *J. Plankton Res. 1*, 85-101.

1 : CEE (1300 m^3), (Saanich Inlet, B.C., Canada). 2 : funnels (diam. = 250 mm). 3 : in threes : attachment and position unspecified. 4 : dry weight; calorific value. 5 : 7 days. 6 : August-October (incl.) 1976.

†*Soutar, A., Kling, S.A., Crill, P.A., Duffrin, E. & Bruland, K.W. (1977). Monitoring the marine environment through sedimentation. *Nature, Lond. 266*, 136-139.
1 : continental shelf (Santa Barbara, San Pedro and Soledad Basin, off Calif., U.S.A.). 2 : cylinder array, equivalent to baffling; mouth area = 615 cm^2. 3 : 10-30 m above the bottom and 100-180 m below the surface in 580 m of water. Timed release of traps facilitates recovery. 4 : dry weight; faecal pellets; fish scales; pelagic molluscs; Foraminifera; Radiolarians; silicoflagellates; diatoms; coccoliths; Mn, Al, Fe, Ni, Cr, Zn, Co, V, Cu, Pb. 5 : 2 to 35 days. 6 : May 1969 ; Oct. 1973. 7 : preservatives used in some traps. The trap was tested in a tank.

†Spencer, D.W., Brewer, P.G., Fleer, A., Honjo, S., Krishnaswami, S. & Nozaki, Y. (1978). Chemical fluxes from a sediment trap experiment in the deep Sargasso Sea. *J. mar. Res. 36*, 493-523.
1 : ocean (Sargasso Sea; 5581 m deep). 2 : pair, funnel with honeycomb baffling (of Honjo 1978). 3 : 5367 m from surface. 4 : clay; $CaCO_3$; silica; organic matter; Si, Al, Ca, K, Mg, Fe, Mn, Ba, Sr, Ti, V, I, Sc, La, Cr, Sb, Cu, Zn, Cd, Ni, Co. 5 : 75 days. 6 : October 1976 - January 1977. 7 : bactericide in one cone of each trap pair. Timed closure of traps. See also Honjo (1978a).

Spyridiakis, D.E. & Barnes, R.S. (1976). *The effects of waste water diversion on heavy metal levels in the sediments of a large urban lake.* Office of Water Research and Technology, Washington D.C. 38pp.
1 : lake (L. Washington, Wash., U.S.A.). 2 : funnels (diam. = 100 mm). 3 : traps between 9 m and 50 m in water depths of 11-60 m. 4 : detritus. 5 : biweekly to quarterly. 6 : 1974-1975. 7 : dustfall/rainfall samples collected in polythene jars (mouth c. 0.1 m^2).

†Staresinic, N. (1978). *The vertical flux of particulate organic matter in the Peru coastal upwelling as measured with a free-drifting sediment trap.* MIT/WHOI Ph.D. Thesis 255pp.
1 : shelf and slope waters off Peru. 2 : cylinder pair I (diam. = 250 mm, ht. = 760 mm, see Rowe & Gardner, 1979); cylinder pair II (diam. = 410 mm. ht. = 1200 mm) closed by timed burn wire. 3 : single pair of surface tethered traps at depths up to 53 m in up to 1000 m of water. 4 : organic C; N; protein; pigments; particle morphology. 5 : day, night and 24 hour deployments. 6 : April 1977 and March 1978. 7 : inter comparisons were made between moored and floating cylinders and the funnel traps of Zeitschel et al., 1978.

Staresinic, N., Rowe, G.T., Shaughnessey, D. & Williams, A.J. (1978). Measurement of the vertical flux of particulate organic matter with a free-drifting sediment trap. *Limnol. Oceanogr.* 23, 559-563.
1 : bay (Buzzards Bay, Mass., U.S.A.). 2 : cylinder, of Rowe & Gardner (1979). (Diam. = 250 mm; ht. = 760 mm. Automatic closing device). 3 : paired traps at 12 m in 20 m of water. 4 : organic matter.

Steele, J.H. & Baird, I.E. (1972). Sedimentation of organic matter in a Scottish sea loch. *Memorie Ist. ital. Idrobiol. 29*, suppl. 73-88.
1 : bay (Loch Ewe, Ross & Cromarty, U.K.). 2 : wide-mouthed jar (diam. = 81 mm). Closed by divers. 3 : from 5 m to 24 m in 25 m of water. 4 : organic matter. 5 : 2-13 days. 6 : 1969-1970. 7 : inverted jars serve as controls.

Stepanek, M. (1963). Sampler of sedimenting plankton. *Sb. vys. Sk. chem.-technol. Praze 7*, 171-173.
1 : reservoir (Sedlice, Zeliv, Czechoslovakia). 2 : funnel. 3 : from 0.5 m to 10 m depth. 4 : plankton; sediment volume and composition. 7 : traps used to investigate algicide action.

Stephens, K., Sheldon, R.W. & Parsons, T.R. (1967). Seasonal variations in the availability of food for benthos in a coastal environment. *Ecology, 48*, 852-855.
1 : bay (Departure Bay, B.C., Canada). 2 : wide-mouthed jar. 3 : held rigidly c. 2 m above the sediment in c. 32 m of water. Positioned and retrieved by divers. 4 : total weight; C and N; phaeophytin; optical density; chlorophyll and nitrate. 5 : 30 days. 6 : 1 year. 7 : see also Seki et al. (1968).

Stiller, M. (1977). Origin of sedimentation components in Lake Kinneret traced by their isotopic composition. In : *Interactions between sediments and fresh water* (ed. H.L. Golterman), Junk-PUDOC, Den Haag, pp. 57-64.
1 : lake (Kinneret, Israel). 2 : funnel. 3 : 1 m above bottom. 4 : tripton (isotopic composition: CO_2, ^{18}O, ^{13}C; total carbonate; organic carbon). 5 : - 6 : 1970-73.

Sugawara, K. (1939). Chemical studies in lake metabolism. *Bull. chem. Soc. Japan 14*, 375-451.
1 : small lake (Takasuka-numa, Japan). 2 : wide-mouthed jars. 3 : 1 m above the deepest bottom of the lake. 4 : Fe, Al, Mn; loss on ignition; total N. 5 : 21-67 days. 6 : 20 months.

Taguchi, S. & Hargrave, B.T. (1978). Loss rates of suspended material sedimented in a marine bay. *J. Fish. Res. Bd Can. 35*, 1614-1620.
1 : bay (Bedford Basin, Nova Scotia, Canada). 2 : cylinders (of Hargrave et al. 1976). 3 : four traps at 20, 30, 40 and 60 m. 4 : concentration and areal deposition of particulate matter. 5 : c. 28 days. 6 : Oct. 1973 - Nov. 1974.

Tauber, H. (1967). Investigation of the mode of pollen transfer in forested areas. *Rev. Palaeobot. Palynol. 3*, 277-286.
Preliminary investigation of air-borne pollen in forest using Tauber's own design of trap (body > mouth). The description of the traps is given in Tauber (1974) and their use in water is investigated in Peck (1972).

Tauber, H. (1974). A static non-overload pollen collector. *New Phytol. 73*, 359-369.
1 : laboratory (National Museum, Copenhagen, Denmark). 2 : body > mouth. Cylinder covered by sloping conical lid with small hole in top. (aperture diam. = 50 mm). 4 : deposition of airborne pollen grains in wind tunnel. 7 : definitive description of pollen trap used in previous studies (Tauber 1967). For tests in water, see Peck (1972).

Thomas, E.A. (1950). Beitrag zur Methodik der Produktionsforschung in Seen. *Schweiz. Z. Hydrol. 12*, 25-37.
1 : lake (Zürichsee, Switzerland). 2 : basin (diam. 260 mm; ht. = 120 mm). 3 : trap 100 mm above the floor in 24 m of water. 4 : Ca, Mg, K, Fe, ammonia, nitrite, nitrate, phosphate; microscopic composition of sediment. 5 : 21 days. 6 : July 1948. 7 : the original description and trials of Thomas' Sedimentmesspfanne (illustrated).

Thomas, E.A. (1951). Produktionsforschungen auf Grund der Sedimente im Pfäffikersee und Zürichsee. *Verh. int. Verein. theor. angew. Limnol. 11*, 409-421.
1 : lakes (eutrophic Zürichsee, Pfäffikersee and oligotrophic Wallenstadtsee, Switzerland). 2 : basin : as Thomas (1950). 3 : as described in Thomas (1950). 4 : specific algal concentrations. 5 : 14-32 days. 6 : Oct. 1949 - July 1950. 7 : this paper describes semi-quantitative data on plankton species recovered in trapped material, in studies reported elsewhere (1950, 1955a). Diatoms main component.

*Thomas, E.A. (1955a). Stoffhaushalt und sedimentation in oligotrophen Aegerisee und in eutrophen Pfäffiker und Greifensee. *Memorie Ist. ital. Idrobiol. 8* (Suppl.), 357-464.
1 : lakes (oligotrophic Aegerisee and eutrophic Pfäffikersee and Greifensee, Switzerland). 2 : basin - "Sedimentmesspfanne" of Thomas (1950). 3 : singly, 100 mm above bottom in c. 20 m depth. 4 : centrifuged volume; wet, dry weight; loss on ignition; Fe, N, P. 5 : 14-37 days. 6 : Oct.1949 - Dec.1951. 7 : extensive study interrelating sedimentation to chemical characters of lakes. Vernal diatoms major component of spring catch.

Thomas, E.A. (1955b). Sedimentation in oligotrophen und eutrophen Seen als Ausdruck der Produktivität. *Verh. int. Verein. theor. angew. Limnol. 12*, 383-393.
1 : lakes (oligotrophic Aegerisee and eutrophic Pfäffikersee, Greifensee, Switzerland). 2 : basin-"Sedimentmesspfanne" of Thomas (1950). 3 : singly 100 mm above bottom in c. 20 m depth. 4 : carbonate; dry wt.; organic; permanganate consumption and oxygen content of trapped material. 5 : 14-37 days (Thomas 1955a). 6 : 1950-1951. 7 : direct comparisons between lakes of different trophic status and between different 'compartments' of the lakes. 'Average' data only.

Thomas, E.A. (1958). Sedimentation und Typeneinteilung des Türlersees. *Verh. int. Verein. theor. angew. Limnol. 13*, 191-195.
1 : small lake (Türlersee, Switzerland). 2 : basin-"Sedimentmesspfanne" of Thomas (1950). 3 : 100 mm above bottom in 20 m of water. 4 : reports annual phosphate recruitment to mud. 5 : "about a month". 6 : Dec. 1951 - Aug. 1953. 7 : compares results directly with those of Thomas (1955a).

Thomas, E.A. (1963). Experimentell untersuchungen uber die Schlamubildung in uberuhrtar und kulkurbeeinflussten seen der Schweiz. *Wass. Abwass.* 1963, 1-19.
Review paper referring to findings of Thomas' earlier studies.

Toyoda, Y., Horie, S. & Saijo, Y. (1968). Studies on the sedimentation in Lake Biwa from the viewpoint of lake metabolism. *Mitt. int. Verein. theor. angew. Limnol. 14*, 243-255.

1 : lake (Biwa-ko, Japan). 2 : wide-mouthed jars. 3 : paired at 10 m depth intervals, to 60 m. 4 : total dry weight; phosphorus; silicate; organic nitrogen; ignition loss; chlorophyll. 5 : 1-4 weeks. 6 : > 1 year (1963-1964)

Trevallion, A. (1967). An investigation of detritus in Southampton Water. *J. mar. biol. Ass. U.K. 47*, 523-532.
1 : estuary (3 stations in Southampton Water, Hampshire, U.K.). 2 : cylinder; closing device. 3 : on sea bed. 4 : dry weight; nitrogen and organic carbon. 5 : monthly. 6 : June 1963 - Sept. 1964. 7 : mesh over the trap mouth excludes large organisms.

Tsunogai, S. & Minagawa, M. (1974). Sediment flux measurements by sediment trap and radiochemical estimation. Geochemistry of Funka Bay, Hokkaido. *Jap. oceanogr. Soc. Ann. Meeting Abstr.* P160.
1 : bay (Funka-Wan, Hokkaido, Japan). 2 : cylinder with funnel base (diam. = 200 mm; ht. = 800 mm). 3 : 30 m and 40 m in 102 m of water. 4 : ^{234}Th. 5 : 4 days. 6 : 15 July - 19 July 1974. 7 : investigated residence time of particulate matter.

Tsunogai, S. & Minagawa, M. (1976). Th-234, Pb-210, Po-210 in the surface and deep waters of the Pacific, as tracers of particulate materials. *Trans. Am. geophys. Un. 57*, 255.
1 : bay (Funka-Wan, Hokkaido, Japan). 2 : cylinder with funnel base as Tsunogai & Minagawa (1974). 4 : particulate material, Th-234, Pb-210, Po-210.

Tutin, W. (1955). Preliminary observations on a year's cycle of sedimentation changes in Windermere, England. *Memorie Ist. ital. Idrobiol. 8* (Suppl.), 467-484.
1 : lakes (Windermere, Esthwaite Water, Ennerdale Water; Cumbria, U.K.). 2 : cylinder (diam. = 80 mm, ht. = 300 mm). 3 : paired traps at 15 m, 30 m and 60 m. 4 : seston (wet volume; organic matter; diatomaceous silica and mineral sediment). 5 : 1 month. 6 : > 1 year.

*Ulén, B. (1978). Seston and sediment in Lake Norrviken. I. Seston composition and sedimentation. *Schweiz. Z. Hydrol. 40*, 262-286.
1 : lake (Norrviken, Sweden). 2 : funnel, basin, Tauber trap. 3 : between 0 and 10 m in 12 m of water. 4 : seston (chlorophyll a, b, c; dry wt.; organic substances; C, N, P; organic and inorganic P fractions). 5 : c. 2 weeks. 6 : 1970-1975. 7 : 4% formaldehyde added to traps.

Urrere, M.A. & Knauer, G.A. (1979). The role of faecal pellets in the vertical transport of material in the pelagic environment. *Abstr. 42nd A. Mtg Am. Soc. Limnol. Oceanogr.*
ABSTRACT ONLY. Faecal pellets collected at six depths off Californian coast in cylinder traps of Knauer et al. (1979).

Wahlgren, M.A., Alberts, J.J., Nelson, D.M. & Orlandini, K.A. (1976). Study of the behaviour of transuranics and possible chemical homologues in Lake Michigan water and biota. In : *Transuranium nuclides in the environment*, IAEA, Wien, pp. 9-24.
1 : lake (Michigan, Mich., U.S.A.). 2 : cylinder "as Wahlgren & Marshall (1975)". 3 : traps at 37 and 60 m in 67 m of water. 4 : seston (nuclides ^{7}Be, ^{144}Ce, ^{137}Cs, Am, Pu, ^{210}Pb). 5 : 1 month. 6 : 1972-1975.

Wahlgren, M.A. & Marshall, J.S. (1975). The behaviour of plutonium and other long-lived radionuclides in Lake Michigan : I. Biological transport, seasonal cycling and residence times in the water column. In : *Impacts of nuclear releases into the aquatic environment*, IAEA, Wien, 227-243.
1 : lake (L. Michigan, Mich., U.S.A.). 2 : cylinder (diam. = 150 mm); perhaps cylinders tested in Wahlgren & Nelson (1976a). 3 : not described. 4 : tripton (radiochemical analysis; ash/dry ratio). 5 : monthly. 6 : 1972-1975.

†*Wahlgren, M.A. & Nelson, D.M. (1976a). Factors affecting the collection efficiency of sediment traps in Lake Michigan. *Rep. Argonne natn. Lab.* Radiological and Environmental Research Division Annual Report ANL-75-60, Part III, pp. 103-106 (available from Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Ill. 60439, U.S.A.).
1 : lake (L.Michigan, Mich., U.S.A.). 2 : cylinder (various diameters and heights some with baffles). Opted for diam. = 150 mm; ht. = c. 750 mm. 5 : - 6 : 2 years.

Wahlgren, M.A. & Nelson, D.M. (1976b). Lake Michigan sediment trap study : preliminary assessment of results. *Rep. Argonne natn. Lab.* Radiological and Environmental Research Division Annual Report ANL-75-60, Part III, pp. 107-110 (available from Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Ill. 60439, U.S.A.).
1 : lake (L. Michigan, Mich., U.S.A.). 2 : cylinder (diam. = 150 mm; ht. = c. 750 mm?) 3 : 10 m to 156.5 m in water depths between 67 m and 159 m. 4 : tripton (plutonium). 5 : monthly. 6 : 1975-1976.

Wahlgren, M.A., Nelson, D.M. & Chase, E.M. (1978). Sediment trap methodology. *Rep. Argonne natn. Lab.* Radiological and Environmental Research Division Annual Report ANL-78-65. pt. III. (available from Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Ill. 60439, U.S.A.).
1 : lake (L. Michigan, Mich., U.S.A.). 2 : cylinders. 3 : 2, 4, 6, 16 and 32 m above the bottom and 10, 20, 30, 50 and 80 m below the surface of the water. 4 : plutonium; ash content; dry wt. 5 : 3-30 days. 6 : > 1 year. 7 : tested the use of different preservatives.

Wahlgren, M.A., Robbins, J.A. & Edgington, D.N. (1979). Plutonium in the Great Lakes. In : *Transuranic elements in the environment*. DOE/DBER Publ. No. TID-22800. (Preprint).
1 : lake (L. Michigan, Mich., U.S.A.). 2 : cylinder (of Wahlgren & Nelson, 1976a, 1976b). 3 : 10, 20, 30, 55 and 65 m in 67 m of water. 4 : seston (plutonium; silica and calcite content). 5 : monthly. 6 : 1976.

Walsby, A.E. & Reynolds, C.S. (in press). Sinking and floating in phytoplankton ecology. In : *The physiological ecology of phytoplankton* (I.G. Morris, ed.) Blackwell, Oxford. pp. 371-412.
REVIEW with short section on the interpretation of results obtained with sediment traps.

Watanabe, Y. & Hayashi, H. (1971). Investigation on the method for measuring the amount of freshly precipitating matter in lakes. *Jap. J. Limnol. 32*, 40-45.
1 : shallow lakes (Yuno-ko and Suwa-ko, Japan). 2 : funnel. 4 : organic and inorganic content.

*Webster, T.J.M., Paranjape, M.A. & Mann, K.H. (1975). Sedimentation of organic matter in St. Margaret's Bay, Nova Scotia. *J. Fish. Res. Bd Can. 32*, 1399-1407.
1 : bay (St Margaret's Bay, Nova Scotia, Canada). 2 : cylinders ((a) diam. = 75 mm; ht. = 310 mm; (b) diam. = 70 mm; ht. = 250 mm; (c) diam. = 375 mm; ht. = 420 mm). 3 : (a) 4 cylinders together at 5 m and 10 m above bottom in 70 m of water. (b) 6 traps placed between 0.45 and 1.97 m above bottom in 10 m of water. (c) 2 traps on sea bed. 4 : total weight; chlorophyll; phaeophytin; organic C and N. 5 : 2 weeks. 6 : July 1970 - May 1972. 7 : tested for resuspension of bottom sediment.

Weglenska, T., Hillbricht-Ilkowska, A., Kajak, Z., Bownik-Dylinska, L., Ejsmont-Karabin, J., Karabin, A., Leszczynski, L. & Prejs, K. (1975). The effect of mineral fertilization on the structure and functioning of ecosystems of various trophic types of lakes. Part II. The effect of mineral fertilization on zooplankton, benthic fauna and tripton sedimentation. *Polskie Archwm Hydrobiol. 22*, 233-250.
1 : four small shallow lakes (Smolak L., Czarna Kuta L., Piecek L. and Dgal Malay; Poland). 2 : wide-mouthed jar (diam. = 114 m; ht. = 300 m). 3 : 6 traps near the bottom and just below the euphotic zone. 4 : "tripton" (= seston?: dry weight, carbon, nitrogen content). 5 : 1 month. 6 : 1970-1972.

Welch, H.E. (1973). Emergence of Chironomidae (Diptera) from Char Lake, Resolute, Northwest Territories. *Can. J. Zool. 51*, 1113-1123.
1 : small lake Char Lake, Canada: (a = 0.53 km^2). 2 : inverted square funnel (diam. = 500 mm x 500 mm). 3 : 0.5 m below surface on several transects from shore. 4 : insect species abundance and stage of growth. 5 : 3 days. 6 : July - Sept. 1971-1972. 7 : study of rising rather than sinking organisms.

Welton, J.S. & Ladle, M. (1979). Two sediment trap designs for use in small rivers and streams. *Limnol. Oceanogr. 24*, 588-592.
1 : experimental circulating channel (at Waterston, Dorset, U.K.). 2 : cylinder (diam. = 71 mm; ht. = 90 mm) with funnel bottom (ht. = 120 mm) and suction trap. 3 : both traps buried flush with the channel bed, and filled with gravel. 4 : dry wt.; size fractionation; organic content. 5 : 2 weeks. 6 : April-Dec. 1977. 7 : designed for use in riverine gravels; recovery efficiencies based on laboratory experiemnts.

Wetzel, R.G., Rich, P.H., Miller, M.C. & Allen, H.L. (1972). Metabolism of dissolved and particulate detrital carbon in a temperate hardwater lake. *Memorie Ist. ital. Idrobiol. 29*, (Suppl.), 185-243.
1 : small shallow lake (Lawrence L., Mich., U.S.A.). 2 : cylinder (diam. = 50 mm). 3 : pelagic zone in < 12.5 m of water. 4 : P.O.C.; $CaCO_3$. 5 : monthly. 6 : 1 year.

*White, W.S. & Wetzel, R.G. (1973). A modified sedimentation trap. *Limnol. Oceanogr. 18*, 986-988.
1 : small shallow lake (Lawrence L., Mich., U.S.A.). 2 : cylinder (diam. = 48 mm). Upper and lower (reference) sections. 3 : 4 cylinders together. 4 : organic and inorganic material; zooplankton. 5 : 14-21 days. 6 : Apr. 1972 - Mar. 1973.

White, W.S. & Wetzel, R.G. (1975). Nitrogen, phosphorus, particulate and colloidal carbon content of sedimenting seston of a hard-water lake. *Verh. int. Verein. theor. angew. Limnol. 19*, 330-339.

1 : small shallow lake (Lawrence L., Mich., U.S.A.). 2 : cylinder, upper and lower sections (White and Wetzel, 1973). 3 : in fours, at three depths (2, 6, 10 m from surface). 4 : total dry weight; organic content; carbonate content; POC, N, P. 5 : 1-2 weeks. 6 : Jan. 1972 - Jan. 1974.

†*Wiebe, P.H., Boyd, S.H. & Winget, C. (1976). Particulate matter sinking to the deep-sea floor at 2000 m in the Tongue of the Ocean, Bahamas, with a description of a new sedimentation trap. *J. mar. Res. 34*, 341-354.

1 : ocean (Tongue of the Ocean, Bahamas, 77°40'W, 24°50'N, North Atlantic) and tested in small, shallow lake (Millstone Quarry, Conn., U.S.A.). 2 : segmented basin (1 m^2, sub-divided into 16 chambers; ht. = 300 mm). Sliding doors close off the lower 20 mm of trap during ascent. 3 : c. 2000 m below the water surface in 2150 m of water and at 15 m in 20 m of water. 4 : total C; faecal pellets; chlorophyll: C, H, N. 5 : 6 hrs and 63 days. 6 : 1973 and 1974. 7 : trapping bias and catching efficiency tested using fluorescein-dyed coffee grounds, in shallow water.

Yakovleva, I.V. (1961). Kharakteristika donnych otlozenii Borshchenskogo vodokhranilishcha gidrologicheskii rezim malych vodoyemov Kurskoi Oblasti. *Trudy Lab. ozerov. 13*, 103-113.

Reference from Bloesch & Burns (1980). NOT SEEN.

Young, D.K. (1971). Effects of infauna on the sediment and seston of a subtidal environment. *Troisième Symposium Européen de Biologie Marine, Supplement No. 22*, 557-571.

1 : bay (Buzzards Bay, Mass., U.S.A.). 2 : cylinders (diam. = 63 mm). 3 : four duplicate traps attached at 1.6 m intervals from the bottom of the sea in 20 m of water. 4 : total seston flux; organic content; size analysis; N. 5 : 9-60 days. 6 : April 1967 - Jan. 1968. 7 : traps replaced by SCUBA divers.

Young, D.K. & Rhoads, D.C. (1971). Animal-sediment relations in Cape Cod Bay, Massachusetts. I. A transect study. *Mar. Biol. 11*, 242-254.

1 : deep bay (Cape Cod Bay, Mass., U.S.A.). 2 : cylinders of three sizes (22 cm^2, 50 cm^2 and 64 cm^2). 3 : attached at 0.2, 0.5 and 0.8 m above the sea bottom, in 34 m of water. 4 : dry weight; organic material. 5 : 3-6 days. 6 : August 1969. 7 : jar caps removed and replaced by divers. Trapping efficiency tested and resuspension rates measured.

Zeitzschel, B. (1965). Zur Sedimentation von Seston, eine produktions-biologische Untersuchung von Sinkstoffen und Sedimenten der Westlichen und Mittleren Ostsee. *Kieler Meeresforsch. 21*, 55-80.

1 : bay (Eckenförder Bucht, West Germany). 2 : cylinder with funnel base. 3 : 4 cylinders together, 1 m from the bottom in 25 m of water. 4 : seston; carbon. 5 : c. 3 weeks. 6 : March 1962 - Jan. 1963.

Zeitzschel, B., Diekmann, P. & Uhlmann, L. (1978). A new multi-sample sediment trap. *Mar. Biol. 45*, 285-288.

1 : continental shelf (Kieler Bucht and Bornholm Basin, Baltic Sea, and North Sea). 2 : funnel (diam. = 400 mm). Collection tubes attached to basal plate rotated at timed intervals to separate collections of consecutive operational periods. 3 : 4 m, 17 m and 32 m from the bottom in 63 m of water. 5 : 4-6 days. 6 : > 1 year. 7 : chloroform added to collecting device.

APPENDICES

Appendix A. List of references grouped according to trap design.

CYLINDERS

(*with funnel at bottom).

Ahlgren (1977), *Anderson (1977), Antsyferov et al. (1977), Bennett (1978), Bloesch (1974, 1977), Bloesch & Burns (1980), Bloesch et al. (1977), Bonny (1976 a,b, 1978), Chalupa & Vorderwinklerova (1959), Chambers (1978), Chambers & Parker (1979), Charlton (1975), *Cowell & Hudson (1968), Davies (1975), Deevey et al. (1977), Dymond et al. (1979), *Fallon & Brock (1980), Ferrante & Parker (1977), *Fitzgerald et al. (1979), Fuhs (1973), Gardner (1977, 1978, 1979, 1980 a,b), Gardner et al. (1978), Gasith (1975, 1976), Hargrave (1978), Hargrave & Burns (1979), Hargrave et al. (1976), Hargrave & Taguchi (1978), Hinga et al. (1979), Hoskin et al. (1975, 1978), *Izeki (1976a), Iz"yurova (1960), *Kamp-Nielsen (1975 a,b, 1977 a,b), Kimmel et al. (1977), Kimmel & Goldman (1977), Kirchner (1975), Knauer & Martin (1979), Knauer et al. (1979), Kupferman & Livingston (1979), Landing (1978), *Landing & Feely (1978), *Lastein (1976), Lau (1979), Mason et al. (1977), *Matsuda et al. (1977), Mesecar & Carey (1975), Mueller (1964), Neame (1977), Nichols & Rowe (1977), Nordlie & Anderson (1972), *Nuhfer (1979), *Ohle (1962), Okuda (1960), Ott (1975), *Parmenter et al. (1979), Pennington (1973, 1974), Peterson & Boysen Jensen (1911), Prahl & Carpenter (1979), Prouse & Hargrave (1979), Qasim & Sankaranavayanan (1972), Ravera & Viola (1977), Richardson & Gardner (1979), Richardson et al. (1978), Rigler et al. (1974), Robertson (1979), Rother & Fay (1977), Rowe & Gardner (1979), Saunders (1976), Soutar et al. (1977), Staresinic (1978), Staresinic et al. (1978), Taguchi & Hargrave (1978), Trevallion (1967), *Tsunogai & Minagawa (1974, 1976), Tutin (1966), Urrere & Knauer (1979), Wahlgren & Nelson (1976 a,b), Wahlgren et al. (1976, 1978, 1979), Webster et al. (1975), Walton & Ladle (1979), Wetzel et al. (1972), White & Wetzel (1973, 1975), Young (1971), Young & Rhoads (1971), *Zeitzschel (1965).

WIDE-MOUTHED JAR

Ansell (1974), Bombówna (1962), Davis (1965, 1967, 1968, 1973), Davis & Brubaker (1973), Deevey (1964), Edwards (1973), Gardner (1977, 1979, 1980a), Gliwicz & Hillbricht-Ilkowska (1975), Hargrave & Burns (1979), Hartwig (1976), Hopkins (1950), Järnefelt (1955), Johnson (1977), Kajak et al. (1972), Kajak & Ławacz (1977), Kajak et al. (1975), Ławacz (1969), 1970), Moore (1931), Mueller (1964), Niklaus (1967), Parsons, von Bröckel et al. (1977), Saijo (1956), Scott & Miner (1936), Seki et al. (1968), Smith (1978), Steele & Baird (1972), Stephens et al. (1967), Sugawara (1939), Toyoda et al. (1968), Weglenska et al. (1975).

FUNNELS

Ahlgren (1972, 1973a), Anderson et al. (1979), Bascom (1977), Bombówna (1962), Brewer et al. (1978, 1979), Brunskill (1969), Deuser & Ross (1980), Dymond et al. (1979), Ellis & Tacket (1977), Eppley et al. (1978), Erez et al. (1979), Fischer & Cobler (1979), Gardner (1977, 1979, 1980 a,b), Hargrave & Burns (1979), Hayashi et al. (1972), Honjo (1978 a, 1980), Iturriaga (1979), Izeki (1976 a), Johnson & Brinkhurst (1971), Koidsumi & Sakurai (1968), Matsuyama (1973), Oviatt & Nixon (1975), Payne & Davies (1977), Pennington (1974), Reynolds (1975, 1976 a,b), Schick et al. (1968), Serruya (1977), Serruya et al. (1974), Smetacek et al. (1978), Sonntag & Parsons (1979), Spencer et al. (1978), Spyridakis & Barnes (1976), Stepanek (1963), Stiller (1977), Ulén (1978), Watanabe & Hayashi (1971), Welch (1973), Zeitzschel et al. (1978).

BASIN (Diameter > height).

Axelsson (1955), Axelsson & Håkanson (1975), Bachofen (1960), Cobler (1979), Cobler & Dymond (1977), Davies-Colley (1977), Davies-Colley & Healy (1978), Dymond et al. (1979), Emery et al. (1954), Gardner (1977, 1980 a), Götzinger (1911), Håkanson (1976, 1977), Heim (1900), Honjo & Roman (1978), Kleerekoper (1952, 1953), Mesecar & Carey (1975), Neev & Emery (1967), Revelle & Shepard (1939), Rhoads & Young (1970), Rossolimo (1937), Shepard (1948), Thomas (1951, 1955 a,b, 1958), Ulén (1978), Wiebe et al. (1976).

BODY > MOUTH

Bonny, (1978), Gardner (1977, 1980 a,b), Glynn (1977), Glynn & Stewart (1973), Grim (1950, 1952), Hargrave & Burns (1979), Höhne & Odrich (1966), Hough (1939), Jones (1976), Jones & Simon (1980), Otto & Benndorf (1971), Patten et al. (1966), Peck (1972, 1973), Pennington (1974), Raymond & Stetson (1931), Reynolds (1979), Tauber (1967, 1974), Ulén (1978).

BAFFLES

Anderson et al. (1979), Anderson (1977), Bascom (1977), Brewer et al. (1978, 1979), Cobler (1979), Cobler & Dymond (1977), Davies & McIntyre (1977), Deuser & Ross (1980), Dymond et al. (1979), Emery et al. (1954), Hargrave & Burns (1979), Hartwig (1976), Honjo (1978 a, 1980), Knauer & Martin (1979), Knauer et al. (1978), Landing (1978), Mesecar & Carey (1975), Payne & Davies (1977), Prahl & Carpenter (1979), Rhoads & Young (1970), Spencer et al. (1978), Urrere & Knauer (1979), Wahlgren & Nelson (1976 a).

Appendix B. List of references grouped according to environment.

LAKES AND RESERVOIRS

Ahlgren (1972, 1973 a,b, 1977), Anderson (1977), Axelsson (1955), Axelsson & Håkanson (1975), Bachofen (1960), Bloesch (1974, 1977), Bloesch et al. (1977), Bombówna (1962), Bonny (1976 a,b, 1978), Brunskill (1969), Burns & Pashley (1974), Chalupa & Vorderwinklerova (1959), Chambers (1978), Chambers & Parker (1979), Cowell & Hudson (1968), Davis (1965, 1967, 1968, 1973), Davis & Brubaker (1973), Deevey (1964), Deevey et al. (1977), Eggleton (1931), Fallon & Brock (1980), Ferrante & Parker (1977), Fuhs (1973), Gasith (1975, 1976), Gasith & Hasler (1975), Gliwicz et al. (1975), Götzinger (1911), Grim (1950, 1952), Håkanson (1976, 1977), Hayashi et al. (1972), Heim (1900), Höhne & Odrich (1966), Järnefelt (1955), Johnson (1977), Johnson & Brinkhurst (1971), Jones (1976), Jones & Simon (1980), Kajak et al. (1972), Kajak & Ławacz (1977), Kajak et al. (1975), Kamp-Nielsen (1975 a,b, 1977 a,b), Kimmel et al. (1977), Kimmel & Goldman (1977), Kirchner (1975), Kleerekoper (1953), Koidsumi & Sakurai (1978), Lastein (1976), Ławacz (1969, 1970), Mason et al. (1977), Matsuyama (1973), Mueller (1964), Neame (1977), Neev & Emery (1967), Niklaus (1967), Nordlie & Anderson (1972), Nuhfer (1979), Ohle (1962), Otto & Benndorf (1971), Peck (1973), Pennington (1973, 1974), Ravera & Viola (1977), Reissinger (1932), Reynolds (1975, 1976 a,b), Rigler et al. (1974), Robertson (1979), Rossolimo (1937), Rother & Fay (1977), Saijo (1956), Saunders (1976), Scott & Miner (1936), Serruya (1977), Serruya et al. (1974), Smith (1978), Spyridakis & Barnes (1976), Stepanek (1963), Stiller (1977), Sugawara (1939), Thomas (1950, 1951, 1955 a,b, 1958), Toyoda et al. (1968), Tutin (1955), Ulén (1978), Wahlgren et al. (1976), Wahlgren & Marshall (1975), Wahlgren & Nelson (1976 a,b), Wahlgren et al. (1978), Wahlgren et al. (1979), Watanabe & Hayashi (1971), Weglenska et al. (1975), Welch (1973), Wetzel et al. (1972), White & Wetzel (1973, 1975).

COASTAL LOCATIONS

Ansell (1974), Basinski & Lewandowski (1975), Bennett (1978, 1979), Davies (1975), Davies-Colley (1977), Davies-Colley & Healy (1978), Emery et al. (1954), Erdtman (1950), Gardner (1979), Hargrave (1978), Hargrave & Burns (1979), Hargrave et al. (1976), Hargrave & Taguchi (1978), Hoskin et al. (1975, 1978), Iturriaga (1979), Moore (1931), Nichols & Rowe (1977), Okuda (1960), Oviatt & Nixon (1975), Patten et al. (1966), Payne & Davies (1977), Peterson & Boysen Jensen (1911), Prahl & Carpenter (1979), Prouse & Hargrave (1977), Qasim & Sankaranarayanan (1972), Rhoads & Young (1970), Seki et al. (1968), Staresinic et al. (1978), Steele & Baird (1972), Stephens et al. (1967), Taguchi & Hargrave (1978), Trevallion (1967), Tsunogai & Minagawa (1974, 1976), Webster et al. (1975), Young (1971), Young & Rhoads (1971), Zeitzschel (1965).

CONTINENTAL SHELF

Antsyferov et al. (1977), Bascom (1977), Berger & Soutar (1967), Dymond et al. (1979), Edwards (1973), Fukushima & Mizoguchi (1958), Glynn (1977), Glynn & Stewart (1973), Hartwig (1976), Knauer & Martin (1979), Knauer et al. (1979), Landing (1978), Landing & Feely (1978), Matsuda et al. (1977), Nichols & Rowe (1977), Ott (1975), Parmenter et al. (1979), Payne & Davies (1977), Raymond & Stetson (1931), Revelle & Shepard (1939), Schick et al. (1968), Shepard (1948), Sholkovitz & Soutar (1975), Smetacek et al. (1978), Soutar et al. (1977), Staresinic (1978), Urrere & Knauer (1979), Zeitzschel et al. (1978).

OCEAN

Bennett (1979), Brewer et al. (1978, 1979), Cobler & Dymond (1977), Deuser (1979), Deuser & Ross (1980), Gardner (1977, 1978), Gardner et al. (1977), Hinga et al. (1979), Honjo (1976, 1978 a, 1980), Honjo et al. (1979), Honjo & Roman (1978), Izeki (1976a), Knauer et al. (1979), Kupferman & Livingston (1979), Mesecar & Carey (1975), Phleger & Soutar (1971), Richardson & Gardner (1979), Richardson et al. (1978), Rowe & Gardner (1979), Spencer et al. (1978), Wiebe et al. (1976).

RIVERS

Peck (1973).

LABORATORY TANKS AND FLUMES

Anderson (1977), Antsyferov et al. (1977), Davis (1967), Gardner (1977, 1979 a, 1980 a), Hargrave & Burns (1979), Hargrave & Prouse (1978), Hopkins (1950), Lau (1979), Peck (1972), Soutar et al. (1977), Tauber (1974).

EXPERIMENTAL ENCLOSURES (CEEs, Limnocorrals, Lund Tubes, etc.).

Bürgi et al. (1979), Charlton (1975), Hayashi et al. (1972), Eppley et al. (1978), Jones (1976), Jones (1976), Jones & Simon (1980), Otto & Benndorf (1971), Parsons, von Bröckel et al. (1977), Reynolds (1979), Sonntag & Parsons (1979), Welton & Ladle (1979).

Appendix C. List of references describing sedimentary fluxes of specific particles or elements.

ORGANISMS, LIVING OR DEAD

(e.g. Planktonic algae, bacteria, foraminifera; zooplankton)

Berger & Soutar (1967), Bloesch et al. (1977), Bombówna (1962), Deevey (1964), Deevey et al. (1977), Deuser (1979), Edwards (1973), Fallon & Brock (1980), Ferrante & Parker (1977), Gardner (1977), Grim (1950, 1952), Hayashi et al. (1972), Hinga et al. (1979), Honjo (1980), Iturriaga (1979), Järnefelt (1955), Johnson (1977), Jones (1976), Koidsumi & Sakurai (1968), Lastein (1976), Mueller (1964), Otto & Benndorf (1971), Payne & Davies (1977), Reynolds (1975, 1976 a,b), Richardson et al. (1978), Rigler et al. (1974), Rother & Fay (1977), Schick et al. (1968), Scott & Miner (1936), Smetacek et al. (1978), Soutar et al. (1977), Staresinic (1978), Stepanek (1963), Thomas (1951), White & Wetzel (1973).

POLLEN

Bonny (1976 a,b, 1978), Davis (1965, 1967, 1968, 1973), Davis & Brubaker (1973), Erdtman (1950), Hinga et al. (1979), Hopkins (1950), Peck (1972, 1973), Pennington (1974), Tauber (1967, 1974), Welch (1973).

FAECAL PELLETS

Bennett (1978), Dunbar & Berger (1979), Edwards (1973), Ferrante & Parker (1977), Gardner (1977), Honjo (1978 a, 1980), Honjo & Roman (1978), Izeki (1976 a), Knauer et al. (1979), Payne & Davies (1977), Rowe & Gardner (1979), Soutar et al. (1977), Urrere & Knauer (1979), Wiebe et al. (1976).

CARBON

Ahlgren (1972, 1973 a), Ansell (1974), Bennett (1978), Bloesch (1977), Bloesch et al. (1977), Brewer et al. (1978), Burns & Pashley (1974), Chapula & Vorderwinklerova (1959), Charlton (1975), Cobler & Dymond (1977), Davies (1975), Deuser & Ross (1980), Dymond et al. (1979), Edwards (1973), Fallon & Brock (1980), Fuhs (1973), Gardner (1977, 1978), Gardner et al. (1977), Hargrave (1978), Hargrave et al. (1976) Hargrave & Taguchi (1978), Hartwig (1976), Hinga et al. (1979), Honjo (1978 a, 1980), Iturriaga (1979), Izeki (1976 a), Jones (1976), Jones & Simon (1980), Kajak & Ławacz (1977), Kimmel & Goldman (1977), Knauer et al. (1979), Landing (1978), Landing & Feely (1978), Mason et al. (1977), Matsuyama (1973), Neev & Emery (1967), Nichols & Rowe (1977), Ohle (1962), Okuda (1960), Oviatt & Nixon (1975), Parsons, Thomas et al.

(1977), Pennington (1974), Peterson (1979), Peterson & Boysen Jensen (1911), Prahl & Carpenter (1979), Prouse & Hargrave (1979), Qasim & Sankaranarayanan (1972), Ravera & Viola (1977), Robertson (1979), Rowe & Gardner (1978), Saijo (1956), Seki et al. (1968), Serruya (1977), Serruya et al. (1974), Smetacek et al. (1978), Staresinic (1978), Stephens et al. (1967), Stiller (1977), Trevallion (1967), Ulén (1978), Webster et al. (1975), Weglenska et al. (1975), Wetzel et al. (1972), White & Wetzel (1975), Wiebe et al. (1976), Zeitzchel (1965).

NITROGEN

Ahlgren (1972, 1973 a), Ansell (1974), Bachofen (1960), Bloesch (1977), Bloesch et al. (1977), Chalupa & Vorderwinklerova (1959), Charlton (1975), Davies (1975), Dymond et al. (1979), Fuhs (1973), Gardner (1977, 1978), Hargrave et al. (1976), Hargrave & Taguchi (1978), Heim (1900), Hinga et al. (1979), Honjo (1978 a, 1980), Jones (1976), Jones & Simon (1980), Kajak & Lawacz (1977), Kamp-Nielsen (1975 a, 1977 b), Kimmel & Goldman (1977), Kleerekoper (1953), Knauer et al. (1979), Landing (1978), Landing & Feely (1978), Matsuyama (1973), Neev & Emery (1967), Nichols & Rowe (1977), Okuda (1960), Oviatt & Nixon (1975), Pennington (1974), Prouse & Hargrave (1979), Qasim & Sankaranarayanan (1972), Ravera & Viola (1977), Rowe & Gardner (1978), Saijo (1956), Seki et al. (1968), Serruya (1977), Serruya et al. (1974), Smetacek et al. (1978), Staresinic (1978), Stephens et al. (1967), Sugawara (1939), Thomas (1950, 1955 a), Toyoda et al. (1968), Trevallion (1967), Ulen (1978), Webster et al. (1975), Weglenska et al. (1975), White & Wetzel (1975), Wiebe et al. (1976), Young (1971).

PHOSPHORUS

Ahlgren (1972, 1973 a, 1977), Bachofen (1960), Bloesch (1977), Bloesch et al. (1977), Charlton (1975), Fuhs (1973), Gardner (1979 b), Heim (1900), Jones (1976), Jones & Simon (1980), Kamp-Nielsen (1975 a, 1977 a,b), Kirchner (1975), Kleerekoper (1953), Knauer et al. (1979), Mason et al. (1977), Matsuda et al. (1977), Neame (1977), Neev & Emery (1967), Okuda (1960), Otto & Benndorf (1971), Qasim & Sankaranarayanan (1972), Seki et al. (1968), Serruya (1977), Serruya et al. (1974), Thomas (1950, 1955 a, 1958), Toyoda et al. (1968), Ulén (1978), White & Wetzel (1975).

METALS

Axelsson & Håkanson (1975), Bennett (1978), Bloesch (1977), Brewer et al. (1978, 1979), Charlton (1975), Cobler (1979), Cobler & Dymond (1977), Ditchburn & McCabe (1977), Dymond et al. (1979), Fuhs (1973), Gardner (1977, 1978), Håkanson (1977), Heim (1900), Honjo (1980), Kleerekoper (1953), Knauer & Martin (1979), Kupferman & Livingston (1979), Landing (1978), Landing & Feely (1978), Neev & Emery (1967), Nuhfer (1979), Prahl & Carpenter (1979), Rossolimo (1937), Saijo

(1956), Serruya et al. (1974), Soutar et al. (1977), Spencer et al. (1978), Sugawara (1939), Thomas (1950, 1955 a).

ORGANIC MATTER OR ASH CONTENT

Anderson (1977), Axelsson & Håkanson (1975), Bachofen (1960), Bombowna (1962), Chalupa & Vorderwinklerova (1959), Chambers & Parker (1979), Charlton (1975), Davis & Brubaker (1973), Deevey (1964), Edwards (1973), Gasith (1975, 1976), Gasith & Hasler (1975), Gliwicz & Hillbricht-Ilkowska (1975), Glynn (1977), Glynn & Stewart (1973), Håkanson (1977), Hargrave (1978), Hayashi et al. (1972), Heim (1900), Hohne & Odrich (1966), Johnson (1977), Johnson & Brinkhurst (1971), Kajak et al. (1975), Kamp-Nielsen (1975 a, 1977 b), Kirchner (1975), Kleerekoper (1953), Landing (1978), Lawacz (1969, 1970), Mesecar & Carey (1975), Moore (1931), Mueller (1964), Neame (1977), Parsons, von Bröckel et al. (1977), Patten et al. (1966), Pennington (1973), Rossolimo (1937), Scott & Miner (1936), Serruya (1977), Steele & Baird (1972), Sugawara (1939), Thomas (1955 a,b), Toyoda et al. (1968), Tutin (1955), Wahlgren & Marshall (1975), Wahlgren et al. (1978), Watanabe & Hayashi (1971), Welton & Ladle (1979), White & Wetzel (1973), Young (1971), Young & Rhoads (1971).

CHLOROPHYLL, PHAEOPIGMENTS

Ansell (1974), Davies (1975), Fallon & Brock (1980), Hargrave et al. (1976), Hargrave & Taguchi (1978), Hayashi et al. (1972), Iturriaga (1979), Johnson (1977), Jones (1976), Jones & Simon (1980), Matsuda et al. (1977), Prouse & Hargrave (1977), Qasim & Sankaranarayanan (1972), Ravera & Viola (1977), Smetacek et al. (1978), Staresinic (1978), Stephens et al. (1967), Toyoda et al. (1968), Ulén (1978), Webster et al. (1975), Wiebe et al. (1976).

PROTEINS, CARBOHYDRATES etc.

Lastein (1976), Lawacz (1970), Matsuyama (1973), Prahl & Carpenter (1979), Steresinic (1978).

GRAIN SIZE

Antsyferov et al. (1977), Chambers (1978), Chambers & Parker (1979), Gardner (1977, 1977 a, 1980 a,b), Gardner et al. (1977), Götzinger (1911), Oviatt & Nixon (1975), Raymond & Stetson (1931), Revelle & Shepard (1939), Reynolds (1979), Richardson & Gardner (1979), Rowe & Gardner (1979), Smith (1978), Welton & Ladle (1979), Young (1971).

MINERALOGY

Bloesch (1977), Brewer et al. (1978), Chambers & Parker (1979), Mason et al. (1977), Neev & Emery (1967), Nuhfer (1979), Reissinger (1932), Serruya (1977), Spencer et al. (1978).

CARBONATE PRECIPITATION

Brewer et al. (1978), Brunskill (1969), Cobler & Dymond (1979), Dymond et al. (1979), Gardner (1977, 1978), Gardner et al. (1977), Hinga et al. (1979), Honjo (1980), Johnson (1977), Mueller (1964), Reissinger (1932), Rowe & Gardner (1979), Scott & Miner (1936), Serruya (1977), Smith (1978), Spencer et al. (1978), Stiller (1977), Thomas (1955 b), Wahlgren et al. (1979), Wetzel et al. (1972), White & Wetzel (1975).

DIFFERENTIATION OF RESUSPENDED MATERIAL IN TRAPS

Basinski & Lewandowski (1975), Davies (1975), Davies-Colley (1977), Davies-Colley & Healy (1978), Davis (1968), Dobson & Johnson (1940), Einstein et al. (1940), Emery et al. (1954), Emery (1978), Fitzgerald et al. (1979), Fukushima & Mizoguchi (1958), Gardner (1977, 1978), Gardner et al. (1977), Gasith (1975, 1976), Hargrave & Taguchi (1978) Honjo (1978 a), Landing (1978), Lastein (1976), Mason et al. (1977), Moore (1931), Parmenter et al. (1979), Payne & Davies (1977), Raymond & Stetson (1931), Revelle & Shepard (1939), Richardson & Gardner (1979), Richardson et al. (1978), Rowe & Gardner (1979), Serruya (1977), Shepard (1948), Sholkovitz & Soutar (1975), Spencer et al. (1978), Steele & Baird (1972), Young (1971), Young & Rhoads (1971).

RADIONUCLIDES

Anderson et al. (1979), Bennett (1978), Brewer et al. (1978), Kupferman & Livingston (1979), Knauer et al. (1979), Spencer et al. (1978), Tsunogai & Minagawa (1974, 1976), Wahlgren & Marshall (1975), Wahlgren & Nelson (1976 b), Wahlgren et al. (1976, 1978, 1979).

STABLE ISOTOPES

Erez et al. (1979), Stiller (1977).

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